BEFORE THE

ARMED FORCES EPIDEMIOLOGICAL BOARD

Field Medical Service School
(FMSS)
Camp Pendleton, California

Tuesday,
February 15, 1994
7:37 a.m.

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WALTER R. DOWDLE, PRESIDENT, AFEB

PRESIDENT DOWDLE: Well, let me say welcome to all of you. This is supposed to be the winter meeting of the AFEB. However, for those of you who have come out from back east, I'm sure this is the spring meeting, very, very clearly, and we certainly appreciate this weather, and for this I think we are grateful to the Navy, as well as the program this afternoon, which you will hear more about.

First I'd like to thank Captain Ledbetter, and all the Navy personnel who have assisted in hosting us, and making this already a very wonderful start.

Before we start, I think it might be useful if -- once again, I think many people know each other, but why don't we just begin, and start around the room with introductions, and just saying who we are, briefly. Why don't we start out over on the far right-hand side.

MS. FALKENHEIMER: Lieutenant Colonel Sherry Falkenheimer, from the Office of the Assistant Secretary of Defense for Health Affairs.

MR. ERDTMANN: Good morning. My name is Rick Erdtmann. I'm the Preventive Medicine Consultant at the Office of the Surgeon General, Department of the Army.

MR. PARKINSON: Mike Parkinson, similar position with the Air Force, Boeing (phonetic) Air Force Base.

MR. ALLEN: Jim Allen, with the American Medical Association, formerly with the Public Health Service.

MR. ASCHER: Mike Ascher, AIDS section of the Virus Lab for the State of California. I'm also an active reservist in the Army.

MR. BAGBY: John Bagby, retired, retired, retired, but still active.

MR. CHIN: Jim Chin, with the School of Public Health, UC Berkeley.

MR. FLETCHER: Gerald Fletcher, Indiana (phonetic) University cardiologist, health, wellness and maintenance.

MR. GWALTNEY: Jack Gwaltney, at the University of Virginia.

MS. HANSEN: Barbara Hansen, University of Maryland.

MR. HARLAN: Bill Harlan, Associate Director for Disease Prevention, National Institutes of Health.

PRESIDENT DOWDLE: Walter Dowdle, CDC.

MR. PETERSON: Mike Peterson; I'm the Executive Secretary of the Board.

MS. KAROL: Maro (phonetic) Karol, with the University of Pittsburgh, in Environmental and Occupational Health.

MR. KULLER: Lou Kuller, University of Pittsburgh -- in epidemiology.

PRESIDENT DOWDLE: I'd say, as all of you know,

that we've held an election for the new president of AFEB, and I was out of the country when the election results came in, but I saw it on CNN, and it's Lou Kuller. Congratulations, Lou, and we'll be going through the formal ceremony at the end of this session tomorrow.

MR. PERROTTA: I'm Dennis Perrotta, Chief of the Bureau of Epidemiology, with the Texas State Health Department.

MR. POLAND: Greg Poland, from the Mayo Clinic.

MR. SCHAFFNER: And Bill Schaffner, from Vanderbilt, in Nashville.

MR. NELSON: Dick Nelson, Commander of Balboa Naval Medical Center, San Diego.

PRESIDENT DOWDLE: I think we can hear in the back. Could we go ahead and start there, as well?

MR. CLIFFORD: Clark Clifford, Canadian Forces Medical Liaison Officer.

MR. BENENSON: Bud Benenson, San Diego.

MR. WERNER: I'm Ted Werner, with the Division of Disease Control, State Health Department, California.

MR. CUMMINGS: Jim Cummings, San Diego School of Medicine, pediatrics and infectious diseases.

MR. GRAY: Greg Gray, epidemiologist, Naval Health Research Center.

MR. HANSEL: I'm George Hansel. I'm the Commanding Officer of Fleet Hospital Operations Training Command.

MR. JONES: My name is Tom Jones, and I'm the Commanding Officer of the Naval Health Reserves.

MS. NELSON: Ann Nelson, Armed Forces Institute of Pathology, AIDS Division.

MR. DOLAN: Matt Dolan, Infectious Disease Department, Wilford Hall Medical Center.

MR. CONLEY: Ron Conley, Knott (phonetic) Laboratories.

UNIDENTIFIED SPEAKER: Navy Environmental Health.

MR. HANSEN: Jim Hansen. I'm with Preventive Medicine -- Forces.

MR. JONES: Bruce Jones, Chief of Occupational Medicine, from the Institute of Environmental Medicine.

UNIDENTIFIED SPEAKER: Dave -- Public Health -- Center.

UNIDENTIFIED SPEAKER: Gary -- Division of Epidemiology --

MR. HALE: Hi. I'm Mel Hale, Commanding Officer -- School -- world's finest amphibious training base, where we train the Navy's finest --

PRESIDENT DOWDLE: Welcome.

MS. KRAUSE: I'm Lou Krause (phonetic) of the -- Service --

PRESIDENT DOWDLE: Thank you, and welcome.

CATHERINE LEDBETTER

MS. LEDBETTER: I'm Catherine Ledbetter. I

wanted to take a minute to thank Captain -- our house here in SFNS (phonetic), and Commander Gardner (phonetic) -- and their staff, who helped set all of those up for us, Captain Edmonson and Commander Hansen from IMEP (phonetic), who set up the -- for us, and my Petty Officer Wilson, whom you met as you came in.

A little moment for the discussion of the brief this afternoon. We're going to have a brief of the base, sometime between 11:00 and 12:00, for about 15 minutes. They will be here, and it's not on your agenda, but they're going to tell you a little bit about what happens here at Camp Pendleton.

The hovercraft is translated right (phonetic). That's a bit of a misnomer, but you're going to be in the buses as they demonstrate the hovercraft, but because of the wind and the rain and sand, and the noise and so forth, you'll be in the buses as the hovercrafts actually function, and then they'll shut them down, and then they'll shut them down, and they'll have a static (phonetic) display. You can get out and walk around and take a look at them.

The Field Medical Service School trains the Navy corpsmen, who treat the Marines in the field, and you'll see that in action, also, this afternoon, and there will be buses to take you to both of those places.

For lunch, we ask that you select one of the items on the Sharky's menus that are available there. The

menus are at the sign-in desk, and you can pick a selection, give it back to us at 9:00, and we'll have those things ready by lunchtime. The restrooms are down the hall on the right, and the photo of the Board will be here at 9:00, so thank you.

PRESIDENT DOWDLE: Thank you. Colonel Peterson.

MIKE PETERSON, EXECUTIVE SECRETARY, AFEB

MR. PETERSON: Good morning, and welcome. I thought I'd just bring the board members and others up to date on some of the actions from the last meeting. I think you'll remember we had three outstanding questions as the result of the last meeting, and the first one that actually dates back two meetings, and that was the tuberculosis question, and I have now received from the three Surgeons General an answer back to the TB question, saying that they support the findings of the Board, and the Board's recommendations. That will now be sent to Health Affairs, so there will be no changes to the TB recommendation that was sent to you.

Also, there was a subgroup form on alcohol use and abuse in the military, as a result of the question that was addressed to the Board last time, and there will be two board members representing the AFEB; those are Doctors Kuller and Schottenfeld (phonetic). In addition, there were other individuals from academia and from the public sector who added to that subgroup, and we're looking forward to having a meeting of that subgroup,

probably in the not-too-distant future.

The third question that was addressed to the Board from the last meeting was regarding tropical medicine training, and I think all the board members have received a copy of that and had the opportunity to comment on it, and what you saw is what went forward, and that recommendation has also now been completed.

So all actions relative to questions that were addressed to the Board, that were outstanding from the last meetings, have now been completed and set forward.

I should mention, while I have everybody's attention and everybody is here, just the dates of the next meetings, so folks can put them on their calendars. I think we mentioned before that the next meeting is scheduled for July 7th and 8th, in the Washington, D.C. area. The exact location is yet to be determined. The meeting after that is October 6th and 7th; again, the location will be determined.

The only other thing I can think of, I did ask the question how many folks brought cameras, but if people would like to take pictures, I think you're welcome to take pictures of just about everything, probably, before we get off the bus. It might not hurt to double-check, and be sure that it's okay to take pictures, but my understanding is that cameras are allowed on base, and you'll probably be able to take photos of just about everything we can see today, if you want to.

Telephones are also available. I guess we can probably check with Captain Ledbetter, if anybody needs to use a phone. I was also told there's a fax machine available, both for incoming and outgoing faxes, if anybody has an urgent need to use that.

That's all I have.

PRESIDENT DOWDLE: Okay. Thank you. Okay. Why don't we begin this morning's report with the -- Medicine Office's Reports, and we'll start this morning with the Air Force, with Colonel Parkinson.

MIKE PARKINSON, UNITED STATES AIR FORCE

MR. PARKINSON: Thank you, Doctor Dowdle. First of all, I'd like to express my appreciation to our hosts here at the Navy, particularly for those of us from Washington, for letting us escape the weather and the stress back there. It's been really nice coming out here, even in the few hours I've been here. I want to thank you all.

Today I'd like to talk to you about some developments in the last three or four months in preventive medicine, public health, from the Air Force perspective. You know, in the Air Force we hate to play second fiddle to the Navy, and the Navy's constant reorganization led us to believe, about 18 months ago, that maybe we needed to reorganize, too.

In all seriousness, under General McPeke (phonetic), the Chief of Staff, and under the increasing

Tri-Service efforts of organizing our wings and bases, we have something called the "objective wing," which is unlike previous years, where basically elements at the base level were organized around types of aircraft or types of machinery or types of units. We've reorganized our wings around more functional lines, that cross equipment, machinery and troops, airmen.

We wanted to see whether or not this reorganization could be done for our hospitals and medical treatment facilities, to reflect the structure of the Air Force, and for the past 18 months there's been an experiment at about three medical treatment facilities around the Air Force, to look at how this reorganization that the line has done, how it might play out in our hospital and medical treatment facilities.

Without going too much into the details of it, what we found, General Sloan briefed General McPeke, just last week, on the findings of that study, that show that, for the most part, the fit is a good one. That is, the way that the line is organized does appear to be applicable to our hospitals and medical treatment facilities, with a few minor exceptions, but, importantly, from the perspective of those of us in preventive medicine, there have been a couple of realignments which I think are very important, and which General Sloan and the leadership of the Air Force Medical Corps also believe are significant, and that is, specifically, the reorganization

of the aerospace medicine entity within each one of our hospitals.

Aerospace medicine is one of the four major units in the medical organization, but formerly two important elements related to operational medicine were really outside the scope of the aerospace medicine division, and those were readiness and health promotion. Both of those functions reported, in a sense, directly to the hospital commander, as opposed to being part of what we call the operational medicine structure at the base level.

Under the reorganization, both readiness and health promotion will be underneath aerospace medicine. Now, what that means from our perspective is, it's very important. Number one is, it makes the link, that readiness is not just treating the patients after they've been injured, but incorporates the philosophy of prevention up front, because aerospace medicine really is the cornerstone of how we do prevention in the Air Force.

Secondly, the notion of health promotion, which before now has increasingly been a numerator-based program, as opposed to having a public health and denominator-based approach, and with the emphasis in aerospace medicine being true public health, with emphasis on epidemiology, we feel that bringing them together in our training programs and in our practice will enhance both of these areas significantly.

So that is just -- literally it was just decided upon last week. How that will play out over the months and years to come is yet to be seen, but I think it bodes well for our approach in these areas.

Secondly, approximately a week ago, a conference was held, a week-long conference, on restudying on how we do readiness in toto in the Air Force. Unlike previous meetings, there was considerable preventive medicine, occupational medicine, and public health input at this meeting, and the output of the meeting reflected that input.

Specifically, the preventive medicine services team, and the relative codes that are put together for who those people are and how they would function, have been upgraded to include preventive medicine, occupational medicine or aerospace medicine-trained physicians, military public health officers, and bioenvironmental engineers, in a philosophical and conceptual way that I think has much more merit than previous organizations of these elements, for our readiness effort.

Secondly, the formation of a specific epidemiology team, which would be used for in-theater support, which many of our sister services have had, if not in concept but also in practice, we really did not have, and that development of that epi-team, which would be used in theater to support the various preventive medicine service teams at the local level, has also now

been codified, and the Air Combat Command will take the lead in fleshing out these concepts and implementing them as needed, as oftentimes they're the wedge when we go into some action out of Langley.

The third conceptual development, which I think is a very important one, happened, of all places, in headquarters of the Surgeon General's Office, which is generally rare, but it's something we call the "optimal health working group." This started out as an informal conversation in the Surgeon General's office, those in health administration, the managed care division, and finally in the aerospace medicine/preventive medicine division, when we realized that really the cornerstone of tri-care and the cornerstone of managed care is health promotion and disease prevention, whether in a population or on an individual basis.

We started meeting informally to talk about how the programs that we were doing health promotion, how did they really interface on the clinical care that was going to be delivered under tri-care in our facilities? How will the Air Force-led regions have to rely upon the aerospace medicine units that are doing such things as periodic physical examinations? How does it all make sense?

We started these informal conversations, and we found it to be a very useful forum, that's going to get into an iterative dialogue with the Office for Prevention

and Health Services Assessment, which I discussed very briefly last time, in San Antonio. For example, about a month ago we had in Doug Camero (phonetic). Doug is the director of clinical preventive services for the Office of Disease Prevention and Health Promotion, of the Public Health Service. Very shortly, the Public Health Service will be launching a national campaign called "Put Prevention Into Practice," which is a series of implementation strategies for physicians, other health care providers, and office staff, to implement the guide to clinical preventive services.

The Air Force Surgeon General has said that he wants to adopt this program and adapt it to Air Force needs, and this optimal health working group, in concert with the Office for Prevention and Health Services Assessment, is developing an implementation strategy for all Air Force MTFs, to adopt the Put Prevention Into Practice Campaign, once it's launched nationally.

So we made a commitment to purchase the kits, to purchase the provider handbooks, to purchase the patient passports for health, all of these tools which have been found to be real useful in increasing the delivery of clinical preventive services in the office setting. That could not have been possible without this optimal health working group, because the health administrators and the managed care people, quite frankly, have the dollars; we don't. We have the ideas. To be honest, I'm being a

little facetious, but that type of networking, at the highest level in the Surgeon General's Office, has been very productive in a short period of time.

In another collaborative effort which I think is very good, Captain Cunnion, Colonel Tomlinson (phonetic) and myself have met several times to go literally line by line through the Tri-Service immunization regulation, which, to our knowledge, as far as we know, has never really been done before, in a face-to-face way.

Our goal is to try to consolidate the regulation as much as possible, not to duplicate existing ACIP or other immunization guidance, and to try to standardize terminology where possible, for various immunization requirements, particularly in the area of things like special forces, deployable units, special ops, things like that, all of which have different requirements, if you'll notice, in this special grid that was in that reg, for those of you who have seen it. It's really quite complicated, and to someone looking from a distance it didn't seem to make a whole lot of sense, and I think we're making some real headway there towards doing that.

You may be aware that, under Ms. Christine Gebby (phonetic), President Clinton has announced a presidential HIV/AIDS education initiative, which DoD Health Affairs and the individual services are talking about how to implement. Basically, the thought is that all federal employees should be aware about AIDS in general, and

specifically supervisors, about how to supervise and deal with employees who may be infected with the HIV virus.

We have had several discussions with our people at the Pentagon, awaiting further DoD Health Affairs guidance on these issues, but that's taken a considerable amount of time. We have also revised our HIV train-the-trainer course in San Antonio, to incorporate some of these measures.

Finally, just to tell you that the future meeting, probably the next one, we would like to have Colonel Jim Wright, who many of you know, my predecessor in this job, come up and brief you on the status of the Office for Prevention and Health Services Assessment. Jim and colleagues are meeting today with Doctor Steve Toich (phonetic) and others at CDC, on their prevention effectiveness initiative. They just returned from a visit to Group Health, Puget Sound, to look at the implementation and tracking of clinical preventive services.

The Surgeon General has fully funded and authorized 37 FTEs over the next year-and-a-half, to staff this unit in San Antonio, and I think we'll be able to do some real cutting-edge projects out of there, and Doctor Wright has expressed his willingness to come and talk more in depth about the organization and function of OPSA (phonetic) in the future.

Thank you.

PRESIDENT DOWDLE: Thank you. A positive report, indeed. Questions, comments anyone would have? Yes, Bill?

BILL SCHAFFNER, VANDERBILT UNIVERSITY

MR. SCHAFFNER: Just a comment. I was interested in Colonel Parkinson's comments about standardizing the immunization requirements. I wonder, is there a way to bring that back to the committee later, and show us how that's working out?

MR. PARKINSON: Sure. I think this has been -- it's a Tri-Service reg, and certainly I think that would be productive.

PRESIDENT DOWDLE: Other comments, questions from the Board? Okay. Thank you very much, and let's move on, then, to Navy. Captain Cunnion? And welcome. Sorry we missed you the first go-around.

STEPHEN O. CUNNION, UNITED STATES NAVY

MR. CUNNION: I think you started a little bit early on me.

PRESIDENT DOWDLE: Yeah, right.

MR. CUNNION: I had taken Thursday off for Lunar New Year, and then Friday with Washington meets (phonetic), so I was a little bit behind the eight-ball figuring out what was happening here.

Rather than being redundant, what Mike said, that the Navy is following a lot of the same paths here, with clinical preventive services, we have a formalized

Navy clinical group that is going through our med manual information stuff, and trying to make it more compatible with the U.S. Task Force. So far, we've started working on the physicals, and we've started eliminating things like UAs and CVCs and EKGs for the healthy soldier, to cut down on costs. Hopefully, we can recapture this money for health promotion.

They always tell you, "What do you have to give?" If you start a new program, they always ask you, "Where are you going to get the money from?," and providentially we can say, "Well, we don't have any money, so we can't move any money from any different fund." So last year we had put money in for health promotion, bid for money, and we didn't get any money, so we figured this way we'd try to save the Navy a few million, and ask for at least half of it back, if not all of it back, to use in health promotion.

So that's going along very well, and I was a little bit hesitant to think that preventive medicine could actually tell the clinical community how to set up some of their guidelines, but it's moving very well, so it's very encouraging.

Our biggest problem will be talked about a little bit later, and that's our ongoing pneumonia outbreak here at Camp Pendleton. The malaria scene that we've been talking about over the last few meetings, from the post-Somalia era, has stopped, and we'll have a little

presentation by Captain Ledbetter on that information, to get you a perspective of it.

MS. LEDBETTER. All right. Good morning, gang. I wish I could take credit for the weather. It has been perfect.

This is the pneumonia picture this year. Every year at Camp Pendleton we have a problem with a pneumonia outbreak, this one particular treating area that the Marines come to after they get out of boot camp, called the "52 area." The 31 area is part of their training while in boot camp, and they still have a dose of vicillin (phonetic) on board. They get a dose of vicillin when they come up to train at that area, so the people in the 31 area are laced with vicillin. Those in the 52 area are crowded together in conditions very similar to boot camp, and field conditions, and the other area encompasses the whole entire rest of the base, active duty cases only.

For this year, I apologize for the typo, it's actually '93-94, but this shows has (sic.) kept a low level all along. There's a little endemic pneumonia, and then the peak that starts every winter began again this winter, right around the holiday period, as it usually does, and we had more sterile site isolates this year than we did last year, and we also had sustained peaks, which triggered the intervention, and you see here we had one pyogenes at the 52 area, and three pneumococcal isolates, one from the 31 area, pneumococcal, and one penicillin-

resistant pneumococcal at another area, main site, actually, not in a training area.

Breaking that up, just to show the epidemic period by week, that one week I can't explain why it dropped off, but it still remained a fairly high level at the 52 area. We began intervention pneumovax (phonetic) while they were still at -- this is the 52 area only, and the low level, and then it starts right after the holiday season, generally, and it stayed up except for that one week when we only had one case, and began the intervention at Camp Pendleton with pneumovax on the -- let's see, I'm sorry, the 18th of January, and on the 31st of January began up here at Camp Pendleton, and I'll show you some slides of that.

From an historical perspective, last year we didn't have to have an intervention. There was a little peak; it wasn't sustained, and then it dropped off. In the year before that, a little different graphic representation, but there was a big peak, began the same intervention, vicillin and pneumovax, and that dropped off fairly rapidly, after the intervention began. They give the pneumovax at the recruit area, when they're still in boot camp, and then they give both vicillin and pneumovax to those people who are already here.

Then '91-92 intervention, different representation, fewer sterile site isolates that year, and it's often very difficult to determine what's causing the

outbreak, and you'll hear more about that later. I'll turn this off for a moment, and show you some slides of how we actually did this.

Okay. Here are the happy campers, lined up and ready to get their pneumovax and penicillin, and we did it out of the gymnasium across from the clinic; that was where we started giving it, in the gymnasium. It took about a week to do. This is the inside. People are lining up, getting ready. We had them sign the informed consent, and this is the team of preventive medicine techs giving it. I know we won't get a lot of sympathy from the East Coast people, but it was too cold in the gym.

UNIDENTIFIED SPEAKER: Where's the icicles?

MS. LEDBETTER: Doesn't count without icicles? Well, we were a little uncomfortable, so we moved the operation into the clinic, and just lined them up in the hall, and had them swab their own arms. Is that in focus?

UNIDENTIFIED SPEAKER: They're shivering.

MS. LEDBETTER: The photograph may not be in focus. Okay. Had one group of 300 people that came in from the field, and those poor guys were so muddy, when they tried to swab their arms they just stirred the mud around, so they haven't been shot yet; we're waiting on those.

That's the pneumovax, and then of course the vicillin. They have to have some privacy for that, so that's a different room, and then they get herded back

outside to wait and see if they anaphylax, so it's certainly not --

That's how we responded to the outbreak this wet season, and I want to thank my colleague, Doctor Ginsberg, for preparing those good color slides for me. I just have a little bit about the malaria, and I want to thank my graduate student, Sue Shallow (phonetic), for preparing these overheads, these graphics.

As you know, there was quite a bit of pneumonia -- I'm sorry, malaria, coming out of Somalia, and this is the representation. We had about 128 individuals, some of whom were unfortunate enough to have both vivax and falciparum at different times, so we actually have, I believe, 134 different cases, but you see the initial peak of falciparum, and then the vivax coming in later, and a few mixed infections, vivax and falciparum, which give a little bit of a cluttered slide, but there it is, just vivax and falciparum, and that one falciparum out in September I haven't understood, but I called and talked to the laboratory officer who diagnosed it, and he said yes, there were crescent-shaped merzoites, and he felt comfortable that it was falciparum.

UNIDENTIFIED SPEAKER: Ma'am, what do you attribute that one month with the large amount of falciparum amongst --

MS. LEDBETTER: Well, they were still in-country. Remember, they went the 9th of December, and

this is January, so they're still there. They're getting their instant onset of falciparum as they've come into country, and conditions were particularly arduous early on, as they were clearing brush and being more heavily exposed, and I think a lot of this is related to exposure.

We broke it down by race and ethnicity, and then did the same for just vivax, and age distribution, of course, follows the age distribution of the Marine Corps. It's mostly in the younger people. Looking at it by company, you see that one company is very heavily represented, One-Seven, who was working by the Juba River in Bardera, and a few others. The other peak here is the Seventh Engineering Battalion. They were out road-building, pushing over -- brush.

When you look at that one company, One-Seven, and break it out into different parts of it, that one unit, A Company, is heavily represented. Some of them, we haven't been able to contact all of these people. We've interviewed many of them face to face. Some of them who have gotten out of the military we've contacted by telephone, and then there's some that we haven't been able to interview at all.

Looking at it by job description, obviously those people who were out in the brush, the infantry and the weapons people, who again are forward-deployed on the job, before the vector control people can get in there, are most heavily represented, and locations, obviously

everybody, practically, was in Mogadishu at some point in time, but we think this is really the problem area, Bardera, where they were working in those particularly arduous conditions.

Okay. That's it for the visuals, but we're just beginning to look at the malaria data, and hope to have some more definitive ideas about how to prevent outbreaks like that in the future. The pneumonia is the current crisis, and you'll hear more about that from Doctor Gray tomorrow. Thank you.

UNIDENTIFIED SPEAKER: Ma'am, I was wondering --

MS. LEDBETTER: I'm sorry; yes.

PRESIDENT DOWDLE: Yeah, please.

UNIDENTIFIED SPEAKER: I was wondering, have you heard that maybe when a Marine unit of Twenty-Nine Palms -- take their prophylaxis?

MS. LEDBETTER: I've heard that rumor, too. Twenty-Nine Palms One-Seven is from Twenty-Nine Palms, and that's the unit that had the heavy exposure, and I think it's really more of an exposure-related problem. In talking to just a few people, I haven't done the controls yet, but in talking to a few people who were there, and didn't get malaria, it almost seems like those people were less apt to take their prophylaxis. Perhaps they were more willing to admit that they hadn't taken it than those people who came with the disease, but it's really very difficult.

In combat conditions, they didn't want to put their nets up, because it made a bigger target to be shot at, so they were reluctant to use their mosquito nets. Also, these people, particularly the One-Seven Unit, were on patrol by this river, and they were patrolling for 12 to 16 hours a day, and then they would just sort of drop where they were and take catnaps, with no opportunity to use mosquito netting.

They didn't like the Deet. Many of them didn't use it. They couldn't bathe for six weeks, at the time. There was no water. The water that they had, clean water, was brought in in small amounts, so they went for a six-period without bathing, and the Deet on their skin is very greasy, and then the red dust that was in the area made a very nasty concoction that stayed on their skin, so they were a little reluctant to use the Deet.

They weren't reluctant to use the pills. They did indeed take their prophylaxis, not necessarily regularly. Those that took weekly mefloquine did a little bit better about taking it, and particularly those units where there were people coming around, usually their corpsmen, on a weekly basis, perhaps at the chow hall or some set area, reminding them to take it, but most of them were taking their prophylaxis. Some of them would forget a few pills, but in no group was there any organized effort not to take it, or not to use preventive measures. They were properly trained and encouraged to do it, but

there were a lot of problems with incorporating that.

Any other questions?

PRESIDENT DOWDLE: Other questions? Yes, Bill?

MR. SCHAFFNER: Were there choices in chemoprophylaxis?

MS. LEDBETTER: The choice was mefloquine. That was the Army's suggestion. However, there was no mefloquine here in the United States, so when the Marines left, in order to have them prophylaxed when they arrived in country, they were begun on doxycycline, and transitioned to mefloquine over a week's time, which probably was inadequate. They probably needed more than that, but at that time that was the guidance. Also, there were a few aviators, and the aviators can't take mefloquine, so they stayed on doxycycline, several heli-pilots.

PRESIDENT DOWDLE: Did I see someone else? Yes.

RICK ERDTMANN, OFFICE OF THE SURGEON GENERAL

MR. ERDTMANN: I just wanted to make a couple of comments from the Army experience. We had a lot of the similar findings that you did, initially having a problem with falciparum, and then later on with vivax. In terms of our forces that were deployed, while they were there, they also, some of the groups were taking doxycycline and some were taking mefloquine, and the group that were taking doxycycline seemed to have more of a problem with the falciparum, and so the thought was, well, maybe it

just didn't work as well as mefloquine. It turns out that further study showed that people that were taking the doxycycline were taking it less religiously than those with the mefloquine, because the side effects were higher, and so they stopped taking it, and that was probably the reason that the doxycycline was not as effective.

The main problem that we had with vivax, on the returning soldiers, was that our initial intelligence that vivax was a very prominent strain over there, so we didn't want to expose thousands and thousands of people to a primaquine (phonetic) if it was not necessary. When we began seeing cases of the vivax, we of course started putting everyone on primaquine, and that has essentially stopped the problem.

MS. LEDBETTER: I didn't have a lot of people reporting GI problems. There were one or two who reported GI problems with the doxycycline. The real problem was that it was daily, and they were in such an intense situation. You know, you tell people, "Well, put it by your toothbrush," but they didn't have time to brush their teeth, and, you know, they were in very intense combat circumstances, and they'd simply forget the daily regimen.

MR. ERDTMANN: Yeah, that was part of the compliance problem; it was not just side effects.

MS. LEDBETTER: Right, and the primaquine, some people didn't take it. Again, it was, you know, they were now back, it was a different scenario. They were not

stressed, in a combat situation, but they were away from that. They wanted to forget, and people tended to relax once they got back in the states, and were not as compliant with taking their primaquine. However, those people who experienced vivax malaria described it as a very bitter experience. They didn't like it, and I'm convinced that they actually did take their primaquine after they came down with vivax, and yet we've had about six people who have had recurrences, after completing a course of primaquine, and I do believe that those people were compliant, and that we really have a problem with relative primaquine resistance.

MR. ERDTMANN: We saw some of those cases, too.

MS. LEDBETTER: Other questions? Thank you.

PRESIDENT DOWDLE: Commander Potter, do you have any other --

MR. PETERSON: We don't have anything further to cover from our units. The presentations here are covering the activities we're involved in, as well as the presentation --

PRESIDENT DOWDLE: I think that's all from the Navy. Just a reminder, folks. Please identify yourself before you address a question, and for those folks in the audience, if it's at all possible, if you have a question, if you could come up to the microphone to identify yourself. We're having a recording made, and I notice our recorder over here developing whiplash. I'm sure he'd

appreciate anybody who would come up to the microphone and identify themselves.

Sir?

GERALD FLETCHER

MR. FLETCHER: Captain Cunnion, I believe you mentioned earlier some deletions you had made in discreting electrocardiogram and urinalysis. What were those others?

MR. CUNNION: CVC, for just a normal routine physical.

MR. FLETCHER: I would certainly agree that an electrocardiogram, that's probably not a very good yield on that. That would be a very cost-effective deletion.

PRESIDENT DOWDLE: Thank you, Captain Cunnion. Let's move, then, to the Army, and Colonel Erdtmann.

MR. ERDTMANN: I'm going to be bringing up three or four topics for the AFEB today. I also would like to share my thoughts about how the Navy has prepared for this meeting. It's nice to get into warm 45-degree weather, although I was expecting 80-degree. Is that going to happen later on in the day? Any promises?

The first item of business I wanted to talk about is the continuing Congressional and media interest in this post-Gulf War problem of mystery illness, the putative "post-Persian Gulf War syndrome." There has been various hypotheses, as you know, expressed about what might be causing these illnesses, from oil well fire smoke

to other petrochemical exposures, leech moniliasis, depleted uranium, vaccines that were used over there, chemical protectants against chemical warfare agents.

Then the latest thing that you've probably been reading about in the newspaper is the fact that perhaps our troops were actually exposed to chemical or biological warfare agents, either purposely on the part of the Iraqis, or perhaps because of results of our own coalition bombing.

I can tell you, with almost absolute certainty, that that in no way is true. This has been looked at from every possible angle, and there's absolutely nothing that stands up to scrutiny, when one looks at that very carefully. There is no support for that allegation, from the standpoint of our intelligence information. Certainly, while we were over there, although we were prepared to make such diagnoses, and to take care of patients, we didn't see a single patient in any of our hospitals that presented with chemical injury due to a warfare agent-type injury, or to a biological weapon like Anthrax or botulinum.

So this just does not hold up, whatsoever, and to suggest that low-grade exposure is now just suddenly showing up, due to exposure to these agents, is just nonsensical. I realize there's a lot of political sensitivity to what I just said, but I don't mind that being recorded for posterity.

UNIDENTIFIED SPEAKER: Some people talk about stress-related.

MR. ERDTMANN: That's right. Some people can't even talk about that. Part of the dilemma with this whole problem is that we cannot even define, or establish a case definition, for the Persian Gulf War syndrome. We have asked Doctor Jay Sanford, a very well-known authority in infectious diseases, as well as an internationally renowned physician, to help us try to develop such a definition. He has reviewed dozens and dozens of charts from individuals who have these sustained illnesses, and has given us a preliminary report.

So far he has been unsuccessful in coming up with a definition that we can use, although he has given us some ideas about how to proceed with perhaps developing such a categorical diagnosis, although, as I said, we have not been successful yet.

We do have a surveillance system in place. As a matter of fact, all of the three services, the Navy, Air Force and Army, do have surveillance systems in place, to try to capture and give some idea about the scope of the problem, although, again, since we don't have a definition, what actually are we collecting? Basically, our criteria are pretty simple. Anyone who was a participant of the Gulf War, who has a persistent medical problem that doesn't have an obvious explanation, is part of our database, and we have so far 149 people entered.

We did a little bit of a check on the first 117 cases, and I'd like to share some of that with you, if you could just show the -- basically, this first view-graph shows the type of data that we're collecting. It's a very simple report. It's sent to us by electronic transfer, and we receive it in our office, and then keep a database. Next.

These are the most common symptoms that are being reported in those reports. I'll leave that up for a second, so that you can digest that. I think these same symptoms are being recorded by the Navy and the Air Force. They're also the ones that are reported by the media, and somehow there seems to be a relationship between what's reported in the media and what's reported in our clinics.

Can I see the next one, please? Unfortunately, as we don't have any objective markers for this illness, which is really, again, part of the major problem -- I apologize for those of you who are sitting down this aisle. You probably can't see that very well, but for those of you who are on the far side, you can. There's a table there that shows, on the left-hand side, these 117 cases that are broken down by various demographic variables, and on the right-hand side are the breakdown of the same variables, of all the people who participated in the Gulf War.

Ignore for the moment the center column, which is the breakout of the Persian Gulf registry that the

Department of Veterans Affairs has, because that registry includes everyone who wants to come in and register, for any reason whatsoever, so it's not necessarily related, or exclusively defined to be those who have the so-called "mystery illness," so just look at the column on the left and on the right.

I can't see it myself, but I wanted to highlight the fact that there seems to be an over-representation of women in our database. It's a relatively small number, so I'm not sure what that means at this point. There seems to be an over-representation of officers, and an under-representation of blacks. Again, I don't know what any of that means at this point. It's just an observation at this point.

The Department of Defense Science Board is looking into this matter in much greater depth. Doctor Joshua Lederberg, a Nobel Prize laureate, is chairing that group. They're hopefully going to conclude that there's no unifying explanation in terms of a specific type of exposure that is encountered for these illnesses, but we're not exactly sure what their actual findings are going to show us.

The Institute of Medicine, which is part of the National Academy of Sciences, is also going to be conducting a three-year study, which they've just begun, to help shed some light on this whole problem, and another major initiative to bring to your attention is the fact

that the Department of Defense and the Department of Veterans Affairs has now established a coordinating office, with several individuals inside of it that are actually organizing a reasonable response to Congressional inquiries and to media inquiries, as well as to monitor new programs and to coordinate research initiatives, so I think that there's some hope that this will get more organized than it has been in the past.

We will continue to keep the AFEB appraised about this, and we may actually be asking specific questions to the Board, to help us sort this all out.

The next issue I'd like to --

PRESIDENT DOWDLE: Doctor Erdtmann?

MR. ERDTMANN: Yes?

PRESIDENT DOWDLE: Before we move off of that, I'd like to see if at this time -- we had some questions on this issue, but also I ask Doctor Harlan if he would also comment on the other activities that are going on, some of which you've already mentioned.

BILL HARLAN, NATIONAL INSTITUTES OF HEALTH

MR. HARLAN: Well, amidst all this milieu of people investigating and looking and trying to determine what this situation is, the Bureau of Veterans Affairs asked the National Institutes of Health to convene a consensus conference. Since I run conferences, along with other things that I do, we responded quickly, by telling them that we only do consensus conferences when we have

data on which people can come to a consensus, and we could find no data here.

However, we are going to have a conference. It will be on April 27th and 28th, of National Institutes of Health, that will be patterned a bit like a consensus conference, in that we'll have two days in which we'll have scientific presentations, including presentations by the various panels and working groups that Colonel Erdtmann noted, and we'll also have a panel of people who will look at the evidence, and sift through it, and also sift through the evidence that's presented, and we're going to provide an opportunity to be presented by people who feel that they're affected or represent groups that feel that they have been affected by the Persian Gulf experience.

We are certainly not calling it a syndrome. We're calling the meeting "The Persian Gulf Experience and Health Effects," and not labeling it as a disease or syndrome. We plan on having people who will discuss the findings with multiple chemical sensitivity, chronic fatigue syndrome, autoimmune disorders, and numbers of other things that have been implicated as being associated with the Persian Gulf experience, and with the symptoms that come out of this.

Our expectation coming out of that meeting is that we will have a panel that will make some comment about the likelihood that such a syndrome or such a set of

conditions exists, what they might look like, including a symptom and sign complex that might be associated with it or not, as the case may be, and some suggestions about how to study this further, but I invite all of you to come on the 27th and 28th, and hear what happens.

As I said, it's going to be, part of it, perhaps a bit of a free-for-all, because we have decided to open it to testimony from groups other than those who are invited to present scientific data. We think that we'll have the information from the Veterans' Registry, which I understand now numbers in the tens of thousands, so I'm told, and they are going to try to bring all of that experience together and present some data from that, as well as data from various other groups.

So I'd invite you to come to the meeting, and we'll see what happens.

PRESIDENT DOWDLE: Are there questions? Yes?

MR. CUNNION: Captain Cunnion. During the Defense Science Board meeting, the last one they held, they did make a motion to at some time bring their information to the Armed Forces Epi Board, so you will have an influence on the information.

(Pause.)

PRESIDENT DOWDLE: Doctor Ascher?

MIKE ASCHER, VIRUS LAB, STATE OF CALIFORNIA

MR. ASCHER: In this area, as well as chronic fatigue, I think what we're missing nationally is a proper

controlled study of the incidence of these things in a population-based sample, and you showed us once before one of your people, what I thought was the bottom line, was that these complaints are basically the same in groups that were not deployed, or in the same military occupational specialty, and could we follow through on that, and get a little more of that? Could the Board sort of help you to say that this is an opportunity to do this?

Now, the chronic fatigue people aren't going to like it, because they will find out that the baseline is the same as in their population, but, you know, everybody has this, at some frequency, and how do you say that?

MR. ERDTMANN: Well, I think that there are clearly some thoughts about doing such a study. Commander Gray, I don't want to put you on the spot, but I know that you and some others are contemplating such a study, and maybe this would be the time to address Doctor Ascher's comment, if you wish to.

PRESIDENT DOWDLE: Can you get near a microphone, but not too close?

GREG GRAY, NAVAL HEALTH RESEARCH CENTER

MR. GRAY: My name is Greg Gray, from the Naval Health Research Center in San Diego. We have proposed three epidemiologic studies; we're calling them comprehensive. The first study is one where we look at a large number of Seabees in the Navy. Our reserve Seabees have had the highest prevalence of reported symptoms, so

we thought we'd look at the active duty Seabees who were stationed in the same areas, and see, based on either the case definition that Doctor Sanford comes up with, or a composite of what we find, outcome measures, case control, and look for identifying risk factors. These would be self-reporting, everything we could ask. It's a pretty lengthy question here already, regarding medicines and environmental threats.

The second study is a large population-based study looking at existing data for hospitalizations. We would compare every veteran, every Gulf War veteran on active duty, and compare them, in a two-to-one fashion, with the controls, who were also on active duty but never deployed to the Gulf, and follow them prospectively through time, for various categories of hospitalizations, as coded in ICD-9 fashion. We would be able to look at these in large groups, as well as individual diagnoses, and hopefully look again for risk factors.

The third study is similar to the second study. It's the same cohorts, except we're looking at birth outcomes, both the fathering of a child and of female Gulf War veterans, their offspring, and following them through time.

Right now the studies are projected to have a five-year course, which would take us to about the eight years post-the end of the Gulf War, and we are anticipating funding from DoD Health Affairs in the

relatively near future.

PRESIDENT DOWDLE: Thank you. Other comments, questions? Yes, Doctor Gwaltney.

JACK GWALTNEY, UNIVERSITY OF VIRGINIA

MR. GWALTNEY: When I make comments, am I talking as Jack Gwaltney of the University of Virginia, or am I talking as a quasi-governmental representative?

PRESIDENT DOWDLE: Well, you're on the Board because you're Jack Gwaltney.

MR. GWALTNEY: All right. Well, I am in infectious diseases, and I see people continuously, and have seen them over 20 years, with these same complaints, and I certainly strongly support the recommendation that this be approached in a scientific way, with proper epidemiologic studies, and if anything good comes out of this, I would think this would be an opportunity to develop information, and an approach to this problem, which has occurred after every conflict that we've had, and which is going to occur in the future. There's certainly nothing new about it.

Speaking as Jack Gwaltney, and as a taxpayer, I think that we are wasting money to pursue this very far, in terms of trying to define an illness, unless we have some objective evidence, and we have symptoms up there, but are there any signs of sed rate, anemia, any objective evidence? I think at some point in time we do have to adhere to basic scientific principles, and what we think

is the truth, and say what we believe.

PRESIDENT DOWDLE: You're absolutely on target.

MR. CUNNION: The Veterans Administration has given mega workups to 50-some people, and have found no major differences. The Army and the Navy have worked up, what, maybe 30, 40 people with a mega workup, and we have not come up with any objective finding.

MR. GWALTNEY: Could I say one more thing? Realize that, despite the best efforts of this group, there will always be people in groups who will never believe what the results of any scientific study are, and they can never be pleased.

PRESIDENT DOWDLE: Doctor Kuller?

LOU KULLER, UNIVERSITY OF PITTSBURGH

MR. KULLER: I think one of the problems we get into here is the fact that we refuse to accept the possibility that psychiatric diseases are really diseases, and the possibility that some of these people actually are suffering from various psychiatric diseases, as well as the possibility something else might be there.

It seems farfetched, but the reality is that things like depression, which all of us recognize as a disease process, and it is an important process, is not acceptable as an explanation for any of these particular types of problems, and I think that's very unfortunate because, in essence, some of these people probably do have substantial psychiatric disorders, that need good

treatment, and we may be doing a disservice by the approaches that we're using to deal with this problem, but it's unacceptable.

It's an interesting phenomenon, that it is unacceptable to have a psychiatric disease, even though we all recognize the fact that there are psychiatric diseases, and that they have a basis in biochemistry and physiology, as well as in the environment.

PRESIDENT DOWDLE: Captain Cunnion, then there's a question in the back.

MR. CUNNION: Again, with the VA and with our services, the most common diagnosis these people have been given, across the board, has been a psychiatric diagnosis.

PRESIDENT DOWDLE: There was a question in the back; I'm sorry. Yes?

KEVIN ROBBINS

MR. ROBBINS: Yes, I'm Kevin Robbins, Rose (phonetic) Air Force Base. I just wanted to say, from the Air Force side, we had about --

PRESIDENT DOWDLE: Could you come up near a microphone?

MR. ROBBINS: I'm saying I'm tracking this for the Air Force. We had about 30 reports, and actually only about 25 of those people have been in the Air Force, and those are just the same 30 people that have been seen at Air Force facilities, but some of them were Army, Marines, and the overall majority were enlisted Caucasian males,

with very few females, very few racial/ethnic groups, other than whites, and I would agree that most of the time when there is an actual diagnosis that is given on the report, it is a psychiatric one.

PRESIDENT DOWDLE: Doctor Hansen.

BARBARA HANSEN, UNIVERSITY OF MARYLAND

MS. HANSEN: It's clear that we're dealing not just with a possible medical problem, but with a political problem, and I'd like to urge that this group or other contacts involve the Office of Science and Technology policy. The individuals there whom I know are interested, and I think they ought to be coopted into helping make public statements, and put forth clear information on this situation.

PRESIDENT DOWDLE: Okay. Yes, Colonel Parkinson.

MR. PARKINSON: Just one quick comment. This seems to be an area -- apparently they have been done, but they haven't been publicized much, that I'm aware of, of cross-cultural studies. I mean, the Gulf was unique in using forces from many allied countries from around the world, and what I heard secondarily was that, when you go back and you look at other non-American allies, they don't have this syndrome, or these self-reported symptoms, whatsoever. It may be a uniquely American thing, in which case it's just the way that we would look at heart disease and cholesterol, and certainly we have a natural

experiment here, with all of our allies.

PRESIDENT DOWDLE: I think many of you will recall that when the Board first discussed this, well over a year ago, is that we felt like that the Department of Defense and the VA should move very quickly, and should also get outside experts as part of the review group. The AFEB felt like it could be of some use, but there really needed to be individuals brought in who were further away from DoD than perhaps we might be.

On the other hand, I think that we did express, very early, and I think that that still holds, that we would be glad to be a part of the process, and would be glad to review any of the studies that any of the services were performing, that might be brought to the Board, and I think this is a service that the Board could provide, and I assume I'm still speaking for everyone here, to say that we would be glad to do that, but clearly I think the process of getting outside experts perhaps is really the more neutral way to go.

Yes, Doctor Ascher?

MR. ASCHER: The problem with suggesting it, if you do a study where you show that the frequency of these symptoms are the same in people who were not exposed, the real issue is that the frequency of these are fixed in a population, and some people report them, and consider themselves sick as a result of this complex, and the chronic fatigue association has gotten to the point, now,

where last month, in the newsletter, they added nasal stuffiness and occasional loose bowels to the case definition.

Well, the problem is, this is what everybody has. I mean, if every time you felt your side of your head itch, and scratched it, and you said, "Gee, I have a disease consisting of scratching my ears and rubbing my whatever," you would have this problem, but the question is, there are people who consider themselves ill in the face of these, and there are people who don't. What's the difference?

It isn't reassurance, it isn't treatment with all the fancy infectious disease things that does anything. It's just that some people think they're sick, and other people have these things all the time and don't think they're sick. We're probably all wrong. We're probably all sick.

PRESIDENT DOWDLE: I think we need to move over one more.

JIM ALLEN, AMERICAN MEDICAL ASSOCIATION

MR. ALLEN: Overall, I'm impressed. With only 149 reported instances of this, I won't call them cases. Out of the tens of thousands of people who were in the Gulf over a fairly prolonged period of time, it's not a very frequent occurrence. I would hope that the NIH efforts to pull this together could perhaps, you know, close it off, unless there's some objective evidence that

there really is something significant going on.

MR. HARLAN: Actually, there may be only 175 or 50 here or there, in the Armed Services. The Veterans Administration, on the other hand, has literally thousands, and I think it's nearly up to 10,000 people who have reported in that they have something that they attribute to being --

MR. ALLEN: So this is just continuing active duty.

PRESIDENT DOWDLE: You can say all of the Board meet the case definition, as well.

MR. HARLAN: Speak for yourself. Sorry to take up your time.

PRESIDENT DOWDLE: No, no. I think it was good to --

MR. HARLAN: We appreciate your bringing this up. In fact, it was a very appropriate time, and so this won't be held against you.

MR. ERDTMANN: I just wanted to bring up, unfortunately, a related issue, but I think worthy of just spending a couple of minutes on, and that is to say that there's a federal effort right now to identify all individuals, all humans, that were involved in any kind of radiation experimentation, from the 1940s to the 1970s.

This was brought up as an issue by Ms. O'Leary from the Department of Energy, and has, by virtue of raising the question, many other federal agencies and

academic institutions are now looking at past experimentation that they've been involved in, including the Veterans Administration, Health and Human Services, NASA, Department of Defense, and, as I said, many academic institutions that have been involved as contractors.

The main concern, really, was whether or not some of this early experimentation was done without consent, or in vulnerable populations such as prisoners, children, mentally handicapped individuals and so on, so that was the main focus.

It's gotten somewhat out of hand, again with expressions by the media of risks that probably have been somewhat overstated, if not greatly overstated, and usually with not the complete facts, but the Department of Defense and the other federal agencies that have been involved have taken this very seriously, and have begun a very extensive and comprehensive look at all past records of research and experimentation, to identify any individuals or types of research that could have put people at risk. We think that there's very few in that category.

The times were different back then, the rules of consent. We had just gotten through developing a very ugly weapon, and people saw an opportunity to turn that around, and make something valuable out of it, and a lot of good research has come out of nuclear medicine and radiobiological-type research, so we sometimes forget the

good side, and just talk about some of the very unusual and rare and negative sides of the events.

Nonetheless, we are continuing to take part in this review process. Our medical R and D command is madly pulling out all their drawers and looking at everything they've done in the past, to see what qualifies, as well as the clinical side, the clinical investigation service, in each of the Navy and the Air Force, and, again, these other federal agencies are doing the same thing. There's a tremendous amount of White House interest in this question, and I think that we need to lay this rest and back to bed, if we're going to, again, gain the public trust.

The only thing I would bring up to this group is assurances, for those of you who are new on the Board, that over the last several decades the Department of Defense research programs are under very tight control, when we deal with human experimentation or human research. The same kinds of requirements for review boards and human consent is true for us as it is for Harvard or any other outstanding academic institution, and we abide by those, so I think, for what we're doing now, there's not a question. The question is, what were we doing in the past?

I'd like to end up with a kind of a very positive thing, I think, and it falls upon what you heard from the Navy and the Air Force, in terms of reorganizing

their prevention programs. As we downsized, and as our resources have become less and less, we are also very much interested in figuring out how we can do prevention and preventive health care more efficiently and effectively.

Can I have the first view-graph? As you know, the Clinton administration is definitely going to push through some sort of health care reform package this year, and the administration and Congress is clearly on the attack, in terms of trying to figure out how prevention strategies can help save the day. Clearly, preventive health care will be a lifesaver for the future, in terms of reducing some of the escalating health care costs.

I can't read my thing, so I'll just go ahead and just look at the -- just put the next one on there. This is a conceptual idea that we recently presented at a couple of lectures, and it's to show that really it's a simple story, that the road to health is a straight one, but there are some dollar signs associated with maintaining an individual or soldier's health.

Every time we take a detour, a sickness detour, it costs a lot of money. It's a toll road, and we've been very effective, and we've been spending a lot of energy right now in trying to reduce that toll itself. With our managed care programs, we've been coming up with the most efficient procedures, the most efficient providers, and the least costly medical facilities, but the whole idea is to avoid the toll road altogether, with prevention

programs, and we've been trying to just get that point across as visually as we could. Next.

Currently in the U.S. Army we have a center of excellence called the U.S. Army Environmental Hygiene Agency, which is involved in environmental health and occupational health endeavors, which are mostly prevention-based. What our concept is is to develop a strategic center that would have more than just these two elements of the package. Next.

For example, our disease control and surveillance efforts are currently fragmented throughout the Army, a little bit here, a little bit there, some at the Surgeon General's Office, some at Rare (phonetic), some at our other headquarters in San Antonio, and we really feel we've got to get all this together, if we're going to become more efficient, so we're going to take that piece, and we're going to bring it into this new center.

We also feel that our surveillance efforts are rudimentary at best, and really need to be seriously organized. There are a lot of databases out there that could be linked together, and a lot of analytic capability and talent out there that could be applied to the existing databases, and so what we're going to do is organize that talent, organize those data bases, to make some sense out of surveillance.

Wouldn't it be nice if we had some information

on outpatient surveillance, for example, for this Persian Gulf, so we could look at how often soldiers who didn't deploy to the Gulf went to the health facilities, and compare to those that did deploy, and what their findings were? We don't have that capability right now, but we feel we need to develop that for the future. Next.

We also need to pull into this -- let me just say that obviously the purpose of having surveillance is you've got to know what your problems are. You've got to follow the morbidity and mortality trends, to understand where to target your prevention efforts, and you also, if you're going to apply some preventive strategies, you've got to know whether you're succeeding or whether your procedures are cost-beneficial. You have to have a surveillance system in place. We just don't have that organized yet. Next.

We also have to have the health promotion and wellness piece into this new strategic center, and we feel this is critically important, for four reasons. One is that our customers really want this service. We have done customer surveys, and they clearly want clinical preventive health services, as well as public health services, on the installation.

We also know that we're going to be competing with civilian industry in the future, as part of this health care reform process, and if we don't have a prevention package that can compete with the Kaisers of

the world, we're going to fall out of the picture, so we've got to get organized there.

Thirdly, the health promotion literature over the last couple of years is becoming robust, and becoming very convincing, that these expenditures, these investments, are paying off, in terms of increased productivity, decreased medical claims, and so there really is some value added to these programs.

The most important reason is that if we want to have our soldiers competitive on the battlefield, we've got to have health promotion strategies and programs that keep the soldiers able to perform: to improve their hearing, to improve their endurance, improve their alertness, to improve their load-bearing capability. These are all things that are going to help keep our soldiers alive on the battlefield. What we need to do is put all those pieces together into one strategic center, and if we do, we've going to have a new dimension. Next, please.

Presently, we're calling this the Wellness and Preventive Medicine Center for the U.S. Army. It will be located up at Aberdeen training grounds, where the U.S. Army Environmental Hygiene Agency is currently located. We really feel that we need a single consolidated center that we can point to, and say, "That center is responsible for prevention. That center is accountable," and we feel that that will really make a difference for our

beneficiary population. We have a vision, and the vision is stated there. I won't read it; you're all capable of doing that.

PRESIDENT DOWDLE: I'm not sure everybody can see it.

MR. ERDTMANN: Could you read it?

UNIDENTIFIED SPEAKER: Yes. It says, "A world-class organization for integration of quality preventive medicine, public health and wellness services, into all aspects of America's Army and the Army community, anticipating and rapidly responding to operational needs, and adaptable to a changing world environment."

MR. ERDTMANN: That's the last view-graph. Can we have the lights on again? This is really an exciting area. We briefed, on Friday, our senior medical management, all of our two-star generals, and they unanimously support this concept, and want to move on with it.

The next challenge is to see whether we can get a general officer to put in charge of this organization. It's envisioned that this organization would be about six or 700 people strong. It currently exists as about a 600 strong organization, currently, just with the two pieces that I showed you, so we're really excited about the potential for that.

We also feel that that same center, which will also include some primary care providers, will be an

integration center for getting prevention services integrated into our primary care system of the Army, so it's not just a think tank, but it's a service center as well.

Actually, that concludes my presentation, but I would welcome any comments or questions about that.

PRESIDENT DOWDLE: Doctor Bagby.

JOHN BAGBY

MR. BAGBY: As an immediate past State Health Officer, I appreciate the definition you have for the new center. However, it was integration within the military, and I would encourage the new center to integrate between the military and civilian services wherever possible, because disease surveillance and prevention on stateside bases, I think it's extremely important that the military be encouraged, and the State Health Department be encouraged, to share data, because several times in the past we have failed to share data, to the discredit of both military and civilian. So I like your approach, but I'd like to see that integration with civilian facilities, also.

MR. ERDTMANN: Yeah, that's a point very well taken. We certainly, in a more detailed briefing, discussed who the major stakeholders are, and certainly the facilities outside the Department of Defense, who include national bodies as well as state health departments, are part of the stakeholder community that we

would be interfacing with, and that needs to be maximized. I absolutely support your comment.

PRESIDENT DOWDLE: Yes, Doctor Fletcher.

MR. FLETCHER: Rick, this is excellent. I really think this might be the real agenda where we could have an example for the country. What type of strength will you have to, say, enforce no smoking, or force people to do some sort of exercise, in the Army? Is this a reasonable consideration?

MR. ERDTMANN: Well, it's envisioned that this center, the strategic center, would come up with a basis of new policy: the science, the cost benefit analysis, the rationale, if you will, the background work for the actual people up at the headquarters that would come out with a policy, so it's doing all of the gut work that you need to do, in order to justify a new position, so that's what their role would be.

PRESIDENT DOWDLE: Other comments? I think I can speak for the Board that I think that the emphasis that we heard this morning, and continuing to hear from the service's own prevention and wellness health promotion, is really very encouraging, and congratulations to all of you.

Okay. Thank you very much. There are no more questions of Colonel Erdtmann. Unfortunately, I understand that Colonel Lutter will not be here, and we'll move on, then, to the Canadian Medical liaison officer.

It's listed incorrectly on the agenda; Commander Clifford will be given that this morning.

CLARK CLIFFORD, CANADIAN FORCES MEDICAL LIAISON OFFICER

MR. CLIFFORD: Mr. Chairman, ladies and gentlemen, it's a pleasure to be here, and again I would like to thank the Navy for giving me the opportunity to get out of Washington for at least a few days. I will just give a bit of an update on the infectious disease situation in our Canadian UN operations over the past bit.

To start with malaria, out of approximately 1,200 personnel who participated in Somalia, there were seven confirmed cases of malaria, four being vivax and three falciparum. Out of 300 who participated in Cambodia, we only had two confirmed cases of malaria, and both of these were falciparum. Present policy is mefloquine, and we don't anticipate any changes there.

In our tuberculosis surveillance, to date we have had five members out of 2,000 who participated in UN operations in Yugoslavia, that have been noted to be TB converters.

In our HIV and AIDS, we have no identifiable cases that are related to UN operations. However, our policy is such that we don't do mandatory pre- or post-deportment screening.

I'd like to, as well, just comment on the initial analysis of a study that's presently going on, on stress disorders, on our troops returning from Yugoslavia,

and the in initial data would indicate that as high as 15 percent depression rates, or post-traumatic stress disorder rates of 15 percent, I'm sorry, and depression rates of about 11 percent. Overall, this gives us one in five were psychologically adversely affected by their Yugoslavian tour.

The study would show a correlation, or tend to show a correlation, between the number of exposures and the rated effect of exposures with PTSD. Personnel with PTSD also tended to rate their training as being inadequate for their UN duty.

Another thing that's following under this study is that the critical incidence stress briefing and debriefings would not appear to have had any effect, at least when we compared the groups who had both pre- and post-deployment briefs and those that didn't. However, the critical incident stress debriefings that were carried out, they were all done when the troops returned to Canada, and of course this was likely weeks, if not months, after the traumatic events occurred.

The third thing I'd like to mention is our Maritime Command smoking reduction policy. As of September of '93, the Canadian Navy instituted a Maritime Command smoking reduction policy. In essence, it precludes smoking in the interior of a ship. This would include the messes, mess decks, working spaces, passageways. Smoking is permitted in designed areas on

the open decks, with the authorization of the individual commanding officer, and of course taking in safety and operational factors.

In addition, no Maritime Command facility ashore will sell smoking material of any kind, and all cigarette machines were removed from the Department of Defense naval property. Additionally, and the real kicker that's got people going, is that the duty-free cigarettes that used to be provided to our ships, or made available to them offshore, is no longer present policy.

That's my report.

PRESIDENT DOWDLE: Doctor Stevens.

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DOCTOR STEVENS

MS. STEVENS: For the stress disorder, you mentioned correlation with exposures. What's your definition of "exposure?"

MR. CLIFFORD: I don't have the total study, unfortunately. I did not have access to it, so I can't give you what their definition is. I would assume it was some significant event, a measurable event of some sort, but I don't have the total study yet. The data is just coming out on it now, and it's getting a significant amount of attention.

PRESIDENT DOWDLE: Are there other comments? Okay. Thank you very much, Commander Clifford.

Why don't we take a break at this point. We are

a little ahead, since we started a little ahead, but we do need to do a few things at break, and one is to get a group photograph, and Colonel Peterson, are you going to tell us how we're going to do that?

MR. PETERSON: Yes. We'd like to take a picture of the Board Members and their preventive medicine consultants, down the hall. I'm told there's a room that looks like it's camouflaged, so we should be able to find it. The Board Members are not allowed to go the bathroom until we get this picture taken, so that's the first order of priority.

The second order of priority, so that we will have lunch today, is for everybody to make sure they get their menu choice in during the break time, and -- we come back.

PRESIDENT DOWDLE: I'd say yeah, we need to give ourselves at least 30 minutes to get all this organized, so 9:30.

MR. PETERSON: Then we'll do pictures first.

PRESIDENT DOWDLE: Yeah. So we'll get the pictures done first, right down the hall. Thank you very much.

(Whereupon, a brief recess was taken.)

PRESIDENT DOWDLE: Thank you. Okay. The next session really is in keeping with our, I think, interesting theme of prevention this morning, and this is on injury and injury control, a subject which we've had

introduced to the Board several times, some time ago, and a subject of which the Board has had continued interest. These three presentations this morning also provide the background for a question which has also been presented to the Board. That has been provided to you by mail before the session, but I'd like to ask Mike if he would make a comment about the question, before we open the presentation.

MR. PETERSON: I've had the opportunity to deal with injury-related morbidity and mortality when I was at Health Affairs, prior to coming to the Board. I've been fortunate enough to work with the folks who recognize the importance of this in the military community, and I've now been given the opportunity of working with the Board, to try to bring to fruition some of the work, I think, that's been done, that you'll hear about this morning.

Basically, the question to the Board and the information you're going to hear this morning is going to lead up, I think, if the Board Members are in agreement, to the formation of a subgroup, to help the services address the leading cause of morbidity and mortality in the military, which is injuries, and we've done this in the past with alcohol. We did at the last meeting, a couple meetings before that. We did that with some HIV-related behavioral and knowledge questions to the Board.

So we now have a couple of subgroups, and after today, hopefully, if the Board is interested in

participating in this, we'll have a third subgroup that will work in the future with the services, and with Colonel Jones, in attempting to decrease the prevalence and incidence of injury, morbidity and mortality.

So, with that as a background, I think we're probably ready to go ahead and get started with some of the interesting data that the military services have to present to us this morning.

PRESIDENT DOWDLE: Good. Thank you, Colonel Peterson. Colonel Jones.

BRUCE JONES, U.S. ARMY RESEARCH INSTITUTE OF ENVIRONMENTAL MEDICINE

MR. JONES: Thank you, Mike, and Mr. Dowdle, Board Members. I'm honored to be invited to present this material to you. Before I start, I'd like to say that I'm Colonel Bruce Jones, from the U.S. Army Research Institute of Environmental Medicine. I'm also the Chairman of the DoD Injury Surveillance and Prevention Work Group.

Before we get started with the slides, there should be two handouts that are relevant to this. The first one is titled "DoD Injury Surveillance and Prevention Work Group Update," and the second one, the more extensive one, is this one, titled "Military Injuries Associated with Training and Operations."

Before I get into the data that we've amassed through the work group and through our research, I'd like to give you an update on the Injury Surveillance and

Prevention Work Group. Due to the perceived importance of injuries as a cause of morbidity in the three services, the Deputy Assistant Secretary of Defense for Environment chartered the group, in September of 1992. We had our first meeting in December of 1992, and have just recently had our fourth meeting.

What we see here, at the top of the page, are the work group members. The Navy seems to be over-represented, but half of those are alternate members, and the composition of the work group has not changed much since that time. The charter for the work group reads: "To be the technical and policy advisor for all aspects of injury surveillance and prevention, functional area experts concerning injury surveillance and prevention, including creation of a database for tracking injuries, types, costs, time lost, et cetera, and coordinating with the DoD subcommittee on information of corporate management."

Okay. Can you hear me all right from here? That's kind of a tall order. We're taking it one piece at a time, and our objectives, as you see here, also listed in the handout, are focused primarily on surveillance at this time, to identify the surveillance and injury data sources and so forth, and I'll go into these in more detail in the successive slides.

Our primary objective right now is, as I said, to identify injury surveillance data sources, for

fatalities, hospitalizations, disability and lost duty time; to document the capabilities of these sources, what their organization is, what their missions are, what their reporting requirements are, what the contents of those databases are, how that's coded. One of these other objectives is to document the incidence, patterns, and costs of injury for the quad services.

In order to achieve these objectives, this was our schedule for the first two years. We're a little behind schedule. We're about a quarter behind schedule. We just conducted, in December, the hospital database briefings, and what we are doing is systematically inviting those agencies and organizations in the three services that we know are repositories of potentially useful information in this area.

We started with, for obvious reasons, with the three service safety centers and agencies, then the hospital databases. Next, probably in the May time frame, we will invite the disability agencies of the three services to brief us, and between that briefing and the Defense Manpower Data Center briefing, we will have briefings from outpatient surveillance systems, including one that's being developed here at Naval Health Research Center, and also a briefing from the casualty offices in the personnel departments of the three services.

We'll have the Defense Manpower Data Center brief us on denominator data for the three services. We'd

like to have the VA, if they will consent to do it, come in and brief us on their databases, since that's another potential source of surveillance information on injuries that occur in the military.

We would like to have the research organizations that either are conducting injury research or have a potential to do that on a routine basis, and then we'd like to re-brief the safety centers, because of their central role in safety and prevention of injuries, and then we'd like to plan with them our reports.

Products that we perceive coming out of the work group include a directory of DoD safety and injury surveillance prevention and control agencies, a report on the work group accomplishments, which we believe will include a description of surveillance sources, documentation of injury impact on readiness of the three services, and documentation of the efficacy of surveillance and prevention programs, and finally recommendations to, now, the Deputy under Secretary of Defense for Environmental Security.

With that, what I'd like to do now is talk to you about military injuries associated with training and operations. I will focus my presentation primarily on the epidemiology and surveillance of injuries in army populations, although I will touch on some other military populations, as well.

Why is there such keen interest in this area?

The reasons are largely because it is a major cause of morbidity and mortality, in terms of deaths, disability, in both inpatient and outpatient care. We know that modifiable risk factors for injuries can be identified. We had good reason to believe that injuries are a preventable cause of morbidity. I'd like to emphasize, however, that it is extremely important to test strategies, especially if they're costly strategies, and certainly to monitor programs. The dividends of prevention are a more efficient of use of resources, conservation of fighting strength, and a reduced burden on the medical care system.

The way I'd like to proceed is to first give you some background on the magnitude of the problem of injuries, primarily in the Army, then to look at surveillance data of trends and causes, and move on to research data, looking both at epidemiology of injuries and prevention strategy testing, and finally a brief segment on program monitoring, and some conclusions that I think can be drawn from what you'll see.

I think that it's intuitively easy to understand the desire and emphasis on preventing aviation crashes, such as we see here, and mishaps involving heavy equipment and motor vehicles. It is less obvious why emphasis and resources should be placed on preventing the more common injuries that occur in association with, especially, weight-bearing events, such as the running obstacle course

you see here, or the bayonet course, such as you see here, or activities like running and marching, which cause the bulk of these injuries.

Scenes like these are typical, especially in basic training, and these injuries are extremely frequent. A sprained ankle may seem like a relatively benign condition. Most individuals recover from them. However, a soldier that has suffered a sprained ankle or a stress fracture, or a similar injury, can be immobilized for a few days to a few months, and during that period his combat effectiveness is neutralized.

So what is the magnitude of the problem? One way of getting a handle on the magnitude of this problem is to compare the rates of injury versus other causes of morbidity, which is what I'd like to do in this next series of slides. If we look at the U.S. military, the three services together, we can see in this slide the death rates from accidents, which they are still called in the vernacular, in military terms, and for those of you who disparage that word, I hope you'll forgive me, and I've been fined 25 cents for its use on numerous occasions, but if you'll forebear.

Anyway, what we see here are deaths from accidents, or unintentional injuries, compared to illnesses, in the U.S. military, from 1980 through 1992, and what's of import here, I think, are two things. One is this marked downward trend in death rates per hundred

thousand, from about 80 per hundred thousand down to about 40 per hundred thousand, a 50 percent reduction, and also that, at all periods in time, unintentional injuries were far and away a more important cause of death than all illnesses combined. Of course, this is a young population. I mean, the average age is in the early 20s, so this should not be surprising. Even in 1992, we can see that the mortality rates are roughly three times as high, two-and-a-half to three times as high.

Not surprisingly, if we look at the same data for the United States Army, the trend in accidental deaths is pretty similar. It's downward, except for this spike here in 1986, which marks the Gander (phonetic) Newfoundland crash. There were about 200 deaths involved with that single crash, but, other than that, the trend is downward, from about 75 to 40 or so per hundred thousand, outnumbering deaths at all points in time, and also what we see depicted on this chart are other causes of injury: hostile action, homicides, and self-inflicted injuries, or suicides, and accidental deaths, unintentional death, injury deaths outnumber all the other causes.

If we look at another definition of injuries out of hospitalizations, we can see something similar here. What we have depicted in this table are the principal diagnostic groups. There are 17 altogether; I don't know that I have all 17 listed here. These are the principal diagnostic groups from the ICD-9 code numbers, the

frequency of cases for 1989, and the percent of the total that those cases made up.

What's of note here is that the two leading diagnostic groups are musculoskeletal system conditions and injuries and accidents. The musculoskeletal system conditions are, 50 to 75 percent of those, are injury related, but chronic conditions, ligamentous injuries, cartilaginous injuries, back injuries, that sort of stuff, and then injuries in accidents. If you look over there, you can see that those two categories account for roughly 30 percent of the total hospitalizations in the Army for that year, and that persists now, in the '90s.

This is data on hospitalizations during conflicts, from World War II to the present, major conflicts, and what we see here is that non-battle injuries account for almost as much morbidity, and in some instances more morbidity, than battle injuries, although in these particular conflicts disease was far and away the most important cause of hospitalization.

More recently, in Southwest Asia, in Desert Shield and Desert Storm, we see that wounded in action accounted for only 5.2 percent of those evacuated from the theater of action to the Seventh Medcom for hospital care. Disease and non-battle injury accounted for 95 percent. When we look at the distribution of injuries in this conflict by type of service, we see that orthopedic injuries accounted for 41 percent of the total. I

understand, anecdotally, that 50 percent of that was due to sports-related injuries, kind of an interesting fact.

Now looking at another operational definition, here what we see, in this table and the next table, are the rates of injury and illness in military and Army populations. Here we see data on male and female Army trainees. The first column are injuries, second column illnesses. In the top rows we see the incidence of individuals with one or more visits per hundred, per month, and injuries among male trainees in this study accounted for slightly less of the incidents than illnesses. For women, it was a risk ratio of about one to one. Total sick call visits, where an individual could make more than one sick call in a month, the ratios are roughly the same for men and woman as illness, .8 and 1.1.

What's of interest here, however, are the days of limited duty per hundred per month, where we see, at the bottom, that the rates for males are five times as high for injuries as illnesses, and for women 20 times as high, and commonly what we see in basic training population are rates for males that are five to 10 times as high, and for women 10 to 20 times as high.

This is data on an infantry unit in Fort Drum, New York, in 1989. We now have several other more recent infantry units that we have examined, with almost identical rates in these units. If we look at the top row, incidence of individual with one or more visits per

hundred per month, the risk ratio is now above one. Sick call visits, more sick call visits, repeat visits, are made for injuries, is what this indicates, and the risk ratio is about 1.6 to one, injury versus illness, but, again, days of limited duty, 11 times as many days of limited duty as for all illnesses; clearly, a significant cause of temporary disability.

I think, seeing this kind of data, it can very easily be agreed that we need some kind of a comprehensive program to prevent injuries. I would submit that some of the critical elements of such a program include surveillance, research, research into prevention strategies, and program implementation, maintenance and monitoring.

We need surveillance to follow trends, to identify populations that are at extreme risk, to identify geographic locations that may have a different distribution of risk. We need research to identify risk factors and causal mechanisms of injuries. We need to test our prevention strategies, especially if they're going to be costly strategies, to make sure that they work, before we deploy them, and once we have programs we need to monitor them, so that we can be sure that they are in fact working.

What I'd like to do now is just review the elements of the program, some of the data that we have on these elements. You've already seen some surveillance

data. Surveillance data as we see here, from the Army safety center, can be used not just to track rates and trends, but also to get some idea of what some of the leading causes, or the types of activities that cause injuries are.

Here we see types of events causing fatalities and accidents in the army. Clearly this category, personnel injuries, which accounts for 60 percent of the total, is a good place to focus some emphasis. Tactical training is another area. Privately operated vehicle collisions and crashes cause a tremendous amount of injury and damage to equipment, followed by wheeled military vehicles, tracked military vehicles, and aviation crashes. These aviation events, while they are infrequent, are of some consequence, because they frequently end up in fatalities.

PRESIDENT DOWDLE: Bruce, could you explain what that "N" was there?

MR. JONES: Down here?

PRESIDENT DOWDLE: Yeah.

MR. JONES: There were 6,347 total events reported in 1992, to the safety center.

PRESIDENT DOWDLE: Okay. They're not deaths?

UNIDENTIFIED SPEAKER: They're not fatalities?

MR. JONES: No, no. These are not fatalities, no. The fatalities only number a few hundred annually, so this is fatality and accidental events of all kinds, so

it's a combination of the fatality data and the accidents.

MS. HANSEN: Could I ask you a question?

MR. JONES: Yes.

MS. HANSEN: What do you mean by "personnel injury?"

MR. JONES: Okay. This slide will, I think, explain for you a little better what personnel injuries are. The categories included in the personnel injury area are sports, combat soldiering, other activities, and I can't tell you what are in those, human movement, maintenance activities, material handling activities, physical training, and noncombat soldiering.

Combat soldiering would be things like tactical parachuting; fast-roping, which you do coming out of helicopters and that sort of thing; infiltration courses, where you're crawling under barbed wire, climbing over obstacles; field training exercises. Noncombat soldiering would be things like the obstacle course, the guy hurdling over that obstacle course that you saw, confidence courses, that sort of thing.

In any case, what's of interest here is that sports account for 20 percent of the total injuries in the personnel category. Of interest in the combat soldiering area is that 50 percent of those injuries are due to tactical parachuting, so that's a big one, and we'll see some more information on tactical parachuting later.

Physical training is of note, if you think about

it, that seven percent of the total injuries in this category are due to physical training, and yet most units only spend an hour a day on this activity, maybe an hour-and-a-half, so that's a big category relative to the amount of time spent.

MS. STEVENS: Have you broken down the sports to what sports they were engaged in at the time of the injury?

MR. JONES: That can be done. I haven't done it, and I can't remember it, but I have lists of sporting activities that contribute to this. Yes?

MS. HANSEN: I'm just still trying to get a picture of what is personnel injuries. Is this just somebody doing an activity, and they trip and fall, versus a car running over them? I'm not sure I understand what personnel --

MR. JONES: Okay. These would be injuries that the damaging event is the expenditure of human energy, as opposed to vehicular or otherwise. There are several categories that the safety center documents: privately operated vehicles, as you saw, wheeled vehicles, and aviation crashes, and that sort of thing, so, these personnel injuries, they don't make any intuitive sense. We could probably come up with a better name for this, but they are events where the primary energy is that of human activity.

UNIDENTIFIED SPEAKER: What is the "human

movement" category there?

MR. JONES: The human movement category is one where soldiers on duty are involved in an activity that doesn't fall into one of the other categories, but it involves movement from one place to another. It wouldn't involve warranteering (phonetic) and that sort of thing, but someone in the woods who's not part of a formal exercise, and steps in a hole, would be included in the human movement category.

UNIDENTIFIED SPEAKER: That would exclude riding in the back of a truck, or a personnel carrier?

MR. JONES: Yes. This is, again, ambulatory energy, people moving themselves from one spot to another.

UNIDENTIFIED SPEAKER: I hate to ask what "other" means, then.

MR. JONES: Yeah. The "other," I have no idea what's in the "other" category. I've glanced through these lists, but I can't remember.

Another potential surveillance source, and I say "potential," the hospitalization records are not actively used for surveillance. In fact, in 1991, when I requested the package of information that you see here, the report that you see summarized some of the information summarized from here. I was told that I was the first person that had asked for cases and denominators, simultaneously, in 10 years, for injuries. People have not been using that database optimally.

In any case, several things are of note here. What we're seeing are frequencies in rates of hospitalization due to injuries to Army personnel for 1979, 1989. If we look at all causes, you can see that the frequencies and rates did not change much from '79 to '89, rates of about 26 to 27 per thousand, and the rates are in terms of individuals hospitalized per thousand per year.

Notable here are that the vehicular crashes as a cause of hospitalization decreased from 5.2 per thousand to 3.3, a 40 percent decline in that period of time. Athletics and sports and physical training became the leading cause of injury hospitalizations, and this group of things here, all of which involved human physical activity, account for about 25 percent of the total injury hospitalizations.

We can use data to look at rates. As we've seen there, we can track trends. As we see here, these are trends for the leading causes of injury hospitalizations of active duty personnel, from 1981 to 1992. You can see, again, that trend of declining hospitalization for motor vehicle accidents, from '81 to '82. We can see sports maintaining its position. It's the leading actual cause of injury. It's been superseded in the coding by late effects of injury, which are from multiple categories, and I can't tell you exactly what that category means.

These codings are not ICD-9 codings. These are

NATO codes, STANAG (phonetic) codes, but these late effects would be things like back injuries, where you may suffer the injury today, but you don't feel the true consequences of it until much later.

In any case, this is in your packet, and you can look at it in more detail. It's just to emphasize what we can do, in terms of identifying important causes. Clearly, we're doing something right in the area of motor vehicle events. Athletics has remained unchanged. There are some other things that we need to look at and get a handle on, and I would submit to you is that one of the points here is that we need to look and see what is in that category of late effects.

Falls and jumps are declining. Also of interest is that hospitalizations due to fighting have declined about 50 percent since 1981, for reasons that are hard to tell.

We can only get so much information from surveillance sources. If we really want to find out what's happening, and we want to determine how to prevent things, we need to do research. When I started doing research, 10, 12 years ago, it was very evident that a leading cause of outpatient visits were training-related injuries, so we went to the training literature, the sports medicine literature for the civilian community, and also for the military, and listed the leading risk factors cited in the literature.

Those could be broken down into two broad categories, as extrinsic risk factors and intrinsic risk factors. Extrinsic risk factors are those things outside of the host. They include things like training parameters, the intensity, duration and frequency of training, rapid increases in those parameters, equipment, such as shoes and boots, training surfaces, other environmental conditions.

Intrinsic risk factors include things that are characteristics of the individual involved in the activity: low levels of physical fitness, anatomic factors such as flat feet and bowed legs, body fat, gender, older age, and prior injuries.

Now, at the time that I did this, one of the things that piqued my interest was that, as I went through the literature, I began to be more and more aware that there was a lot of anecdotal evidence, and there were a lot of hypotheses circulating about what caused training-related injuries, but there was very little substantive information. In fact, in the early '80s, the only thing that had been demonstrated, of all these, to be clearly associated were training parameters, and the CDC had done some of that early work, Jeffrey Koplan and Ken Powell.

So we set out to systematically look at these risk factors, and to look at the association between these risk factors and injuries, and what you'll see now is what the outcome of that research has been.

I show this slide of a JAMA article published in 1982, conducted by Jeffrey Koplan at the CDC, because it's a classic article. It was one of the first studies that really showed a relationship between volume of training, in terms of weekly training mileage, and risk of injury, as a percent injured during the course of a year.

What we see here is that injury rates for both men and women increased steadily upwards, from groups training zero to nine miles a week to those training over 50 miles a week, rates increasing from about, in terms of injuries that affected their training, from about 20 percent per year up to over 60 percent in the stippled areas, or physician visits.

This was one of the first things that we examined in our research. Running, as a mode of establishing endurance and fitness, is very common, in both basic training populations and trained populations. Marching is another weight-bearing activity that's extremely important.

In any case, in 1987, we went to Fort Benning and studied a low-mileage unit and a high-mileage unit, and their training was the same in all other regards, except for the volume of high-intensity weight-bearing training. The low-mileage unit ran 60 miles in 12 weeks. The high-mileage unit ran 130 miles, average miles of about five miles, six miles a week for the low-mileage group, and 12 miles for the high-mileage group.

That may not seem like very much, but when you consider that they start out at one mile a day in the first week and gradually work up, and that they have two weeks of their training cycle, at least, that they do no running -- when they do basic rifle marksmanship they don't run, because it affects their marksmanship, and when they go on their field training exercises they usually do more marching and less running.

In any case, the injury rates of the high-mileage unit were about 30 percent higher than for the low-mileage unit, and when we plotted the cumulative incidence of injury versus cumulative days of training, not surprisingly the rates of injury -- the inverse of this would be a survival curve, and when we did survival analysis on this data there was a significant difference between the high-mileage unit and the low-mileage unit, the high-mileage unit ending up with a risk of lower extremity injuries, or an incidence, of about 41 percent, the low-mileage unit of about 31 percent.

We weren't sure that this was the whole story, so we plotted the data in a different way. What you see here is a plot of cumulative incidence of injury by cumulative miles of running, and for all practical purposes the curves are the same, so at any point in mileage over a circumscribed period of time, such as a few months, this suggest that we can expect the rates of injury, in populations where other conditions are the

same, to be the same. It suggests that there's a finite risk of injury per mile run, perhaps per footstep.

Adding interest to this is this slide, comparing final fitness test scores, where we see that the average run times of the low-mileage unit were, if anything, faster than for the high-mileage unit. I would submit to you that the high-mileage unit had several other cardinal signs of overtraining. They had decreased performance, and they had increased injury rates. This suggests that there may be some point where you can counterbalance risk with benefit, in terms of physical fitness.

Another common weight-bearing activity that has been historically associated with risk of injury is marching with heavy loads, such as these infantrymen we see in Grenada, and the association between marching and risk of injury we see quantitated in terms of days per week of marching training, and you can see that those individuals who marched less frequently had significantly fewer injuries, in this infantry unit, that those who march four more days per week.

If physical training is the primary risk factor for training-related injuries, it makes some intuitive sense that low levels of physical fitness would also be a risk factor. We examined that, and in fact that is what we have found, consistently, in basic training populations, also in infantry populations. Now, what we see here are basic training data, looking at the

association of mile run times and incidence of injuries, and we can see, when we divided these male basic trainees into four equal-sized groups, from fast to slow, the fastest groups had the lowest risk of injury, and there appeared to be a significant upward trend in risk, from about 10 or 12 percent to over 40 percent.

When we looked at women in that same population, we saw a similar trend. What's of note here is that the rates are higher, going from about 35 percent to over 60 percent, in eight weeks, and also, if you want to look back over this again, in the bottom corner you see the average run times, and the run times for women were about two minutes per mile, three minutes per mile, slower than those for men. The mile run was done in the first week of their basic training cycle.

This is just to illustrate the point that it doesn't matter how we define injuries. We see the same male population we just saw, now looking at association of time-loss injuries with run times, and there were no time-loss injuries in the faster groups.

Now, this raises an interesting question. You saw earlier, in a population that we looked at, the rates of injuries for women were higher than for men, and in fact, in all of the studies done in the decade of the '80s, when we looked at men and women simultaneously at the same training posts, the risk of injury for women were almost double those of men, the rates for men ranging from

about 20 percent to 30 percent, and for women from 40 percent to 60 percent. These are individuals with one or more sick call visits for injuries, is the operational definition we're looking at.

Well, the rates of injury are higher for women, but, as you just saw, physical fitness is associated with injuries, also. We have known for some time that women come into the Army with lower levels of physical fitness, as measured by run times, pushups and situps, and with higher percents of body fat, so the question becomes, what happens when you control for physical fitness?

We conducted a study at Fort Jackson in 1988. This was published as an abstract at APHA in 1993, and in that population, just as others, the risk of injury for women versus men was about double, as we see over on the right-hand side of this slide, and when we looked at risk by quintile, now, since we have a larger population, of run times, when we combined men and women, and they compared on the same scale, that risks from fast to slow went from about 20 percent to about 70 percent, and when we stratified, using a metahensile kai square (phonetic), risks of women versus men, there were no women in the fastest group, so we couldn't compare them, but in all the other stratum the risks declined towards one, and were nonsignificant. The summary risk ratio, I believe, was about 1.3.

We got the same results when we used the

logistic regression to control not just for running, but other fitness factors and body composition, and age as well, which suggests that men and women of equal fitness have very similar, if not the same, injury rates.

Okay. We've looked at physical training, physical fitness. How do you get fit? You train. So, in the present, if you and I are running, and I run more miles than you do, I'm going to be at greater risk of getting an injury. The question is, what bearing does past physical activity have on current risk? Being physically active is the way you get fit.

What we had found when we looked at self-assessed activity levels, versus incidence of time-loss injuries and other injuries, as we see here, for male trainees at Fort Jackson in 1984, as we go from inactive on the left to very active, there's a significant downward trend, from about 40 percent to three percent, so those who are more physically active coming into the service appear to be at significantly lower risk, for males.

For women, however, we found no association in this population, nor in subsequent populations. I'm at a loss as to how to explain this, but if we look at another male population, looking at a specific injury, stress fractures, in collaboration with Walter Reed Army Institute of Research we did a study at Parris Island, on 3,000 Marine recruits, because they were concerned about a stress fracture epidemic, and what we see is that those

individuals who are the least active coming into the service are at greater risk, so physical activity prior to service appears to have a bearing on your risk of injury during training.

Now, so far what we've seen makes intuitive sense and supports the sports medicine literature. Some of what the sports medicine literature suggests is not only not supportive, but when we look at it closely it appears not to be true. The sports medicine literature would lead us to believe that the more flexible you are, the less likely you are to be injured. We have used several field expedient measures, toe-touching being one of them. We have also used more clinical measurements, looking at range of motion of the hip and back and other joints, applying doniometric (phonetic) techniques. The results are the same, in both military training populations and collegiate athletes.

We see, with almost every population we've looked at, this bimodal curve, going, by quintile, from high flexibility to low flexibility. Those individuals at the extremes of flexibility are more likely to be injured. Now, this population was not big enough to look at the types of injuries, specific injuries. These are just lower extremity injuries, but it appeared that the high-flexibility group had more joint injuries, and the low-flexibility group had more muscle injuries, and that's something that deserves some attention in the future, and

would make some sense, if it turns out to be true.

Another risk factor commonly cited in the literature is foot morphology, with flat feet being something that is felt to be associated with risk of injury in military populations. In order to screen large numbers of people, we used a photographic technique to take floor plane photos of the feet, and what you see here is the medial aspect of the foot, the arch. This blue line here is the soft tissue arch. It's made with a soft, eraser-like instrument with blue chalk on it. We also marked the head of the evicular (phonetic) bone, as a marker for anatomic structure. We measured the height of the dorsum of the foot, and we created ratios or indexes of the height to the length of the foot, so it's an arch height-to-length ratio.

It didn't matter what ratio or index we used: the results came out looking like this. The index that we find to be most strongly associated is an evicular height-to-foot length, and what we see here is that the flattest 20 percent of individuals in this infantry training population had the lowest incidence of injuries. The highest arches had the highest risk, and we now have a population of 2,000 men and women that we're in the process of analyzing.

While you can't see this here, this guy has an ankle injury, and he's smoking a cigarette. Now, that was a serendipitous photo on a loading dock, of a soldier who

had hurt himself playing basketball. Our discovery of this was somewhat serendipitous. We were looking at smoking, primarily because we were interested in the association between smoking and physical fitness. Since we had injury data, we decided to look at the risk of injury in smokers versus nonsmokers, and this is what we found in an infantry basic population, was that those who had never smoked had the lowest risk of injury. Those who smoked 10 or more cigarettes per day had almost double the risk of those who were nonsmokers.

We have since looked at several other basic training populations, and also at several infantry and special forces units. This is data from an active-duty infantry unit at Fort Ord, California, and again you see the same trend. The nonsmokers have less than half the risk of those smoking 20 or more cigarettes per day. When we control for physical fitness, smoking continues to be a risk factor, and we'll see that in a multivariate model a little later.

So far, what we've looked at are the associations of physical training with risk of injury. We have begun looking at tactical training, primarily parachuting, and we can document several risk factors. This one makes, I think, pretty good sense. We looked at the effect of parachuting at night and daytime, on rates of jump injuries among 550 rangers in a ranger battalion, basically the whole unit, and we see the rate of injury

per hundred jumps here, and the rates are about half as high for daytime jumping as nighttime jumping.

Also of interest are the effects of the type of drop zone that they jump into, on rates. This is the same population. The study was conducted over 18 months, in collaboration with the ranger battalion surgeon. Open fields were the least hazardous place to jump, paved airports next highest, dirt airstrips the highest. These dirt airstrips, you may think that a dirt airstrip is a softer place to land, but basically what they do is they have a steep crown on them, there are big ditches on both sides. They just bulldoze rocks and dirt, often, to the outlying areas, and so it is actually a more treacherous place for an airborne soldier to land.

So far, we've looked just at univariate risks, and the data is very interesting. We have done some multivariate modeling. Because of the complex multifactorial pathways of injury causation, I think that ultimately this is where the money is going to be, is to look for constellations of risk factors that contribute highly to risk, or risk profiles, if you will.

This is data on that Army infantry training unit that you've seen so much of, from Fort Benning, and the risk factors. These are the results of a backward-stepping logistic progression model. The factors that were permitted to enter the model were age, race, activity, job activity prior to the service, jogging

history prior to the service, past injuries, strength, flexibility, run times, pushups, situps, and body fat.

These are the ones that fell out as being significant: individuals over the age of 23 were almost, if you look over on the right-hand side, three-and-a-half times the odds of injury of those under 23; cigarette smoking, again, in controlling for these factors, still a risk factor, two times higher; sedentary job activity, two times higher risk. Past running; those who ran less than four days per week were at double the risk of those who ran more than four days per week, in the two months prior to coming into the service. Flexibility, when we control for all these other factors, still falls out as a bimodal risk factor, and pushups, those who did the lowest number of pushups were at greater risk.

I think we could see a lot of potentially modifiable risk factors that could end up preventing injuries, in what we've seen so far. The next series of slides is to emphasize how important it is in this area to your strategies, again especially if they're going to cost you money.

The first example I'd like to present came to us in 1985. The Marine Corps perceived that they had an epidemic of stress fractures at Parris Island. They wanted to buy shock-absorbent insoles on the basis of the sports medicine and running literature. Zorbathane (phonetic) was the most shock-absorbent material available

at that time, and everybody was thinking it was a solution to training injuries. The Marine Corps decided that they'd buy a couple of pair for every incoming recruit and put them in their boots. Fortunately, before they decided to do that, they came to us and asked us to test whether this would prevent stress fractures. These are the results of that study.

What we found was that the shock-absorbent insole, the incidence of stress fractures was no different than for the control group. The groups were randomly assigned to wear either the shock-absorbent insole or a non-shock-absorbent insole, and the same pattern was found for all other overuse injuries as well. There was really no difference in the rates, so we figured that, for $50,000 of research money, we saved the Marine Corps millions of dollars in insole costs.

Subsequent to that, the Natick Research and Development Labs, which are collocated with my research organization, did a study of other types of shock-absorbent insoles, with the same result.

Surveillance data has not been systematically or routinely used in the past, to focus research programs. However, as I told you, one of the striking observations from the safety center database is that 50 percent of combat soldiering injuries are due to tactical parachuting. We also know from the literature on parachuting that 50 percent of those injuries are due to

ankle sprains.

Colonel Jack Ryan, who is now at the Institute of Surgical Research at Fort Sam Houston, Texas, did his undergraduate work at West Point, went on and became an airborne ranger, qualified soldier, and then went on to become an orthopedic surgeon. When he returned to West Point as an orthopedic surgeon, he became very interested in ankle injuries in basketball players, because they were so common at West Point, and he went to the Air Cast (phonetic) Corporation and several other groups, but the Air Cast people provided him with an inside-the-shoe brace that they put on basketball players, and they were successful in reducing the incidence of ankle sprains in basketball players by about 60 percent.

Well, a few years later, his memories of airborne ranger training came back to him, and he thought, "Why don't we put a brace on parachutists?" Well, the problem became one of an inside-the-boot brace would be unacceptable. It would be hard to adjust, it would be hard to get off, you know, it would decrease your mobility. So the same corporation had a model that could easily be modified to fit outside the boot, which they did, and we tested this brace that you see here. It has velcro straps, so you can wrap it around, quickly adjust it. It has a strap that fits under the sole of the boot, so you can adjust the tightness, not only up-and-down movement, but also to clasp the brace more tightly to the

boot.

This is what the brace looks like when it's on the foot, and these were the results of our first trial. We were originally scheduled to do this at Fort Bragg, in an operational unit of the 82nd Airborne. However, they deployed to Florida for the hurricane, and we were quickly invited to go to the Airborne School at Fort Benning, Georgia, where we followed 770 volunteers, who made 3,885 jumps in a week. In Airborne School, the last week of their training, they do five jumps. They have to make all five in order to graduate.

In any case, what we found was that the incidence of ankle sprains in the non-braced group was 1.8 percent, versus .3 percent, over that period of time, for the ankle-braced group, a risk ratio of six to one.

We have subsequently done a small study of the 82nd Airborne. This was one jump, on a very dark, cloudy night, very adverse conditions, rain, background winds of just below the allowable limit, which I believe is 10 knots, and gusts over the limit, and the incidence of injury there for the non-braced group was 4.1 percent, versus 4.7 (sic.), a risk ratio, again, of about six.

It looks like the brace is effective. These are only two small studies. We'd like to look at more operational units, and are currently looking at special forces, who tend to carry heavier loads. In any case, this is an example of where monitoring is important. You

saw a very high success in our studies. The Airborne School keeps routine statistics. In comparing the first 20,000 jumps in the brace, they went out and bought the brace, after the trial, and they had a 50 percent decrease in ankle sprains in the first 20,000 jumps, and an 80 percent decrease in ankle fractures.

Interestingly, however, more recently the rates have been going up somewhat, and they have not been so successful. They think what's happening is, the original purchase of braces, which they continually reuse, are beginning to fatigue, and are not providing as much protection. In any case, we're waiting with great interest to see what accounts for the decrease in the effectiveness of the brace, based on recent monitoring.

Research needs to be conducted not only into injury rates, but also, sometimes, into the tools that we use to measure injury with. Stress fractures such as we see here, this halo of new bone growth here, is indicative of a fracture. I would call it a stress reaction, but in the sports medicine literature it would be a stress fracture.

This type of injury is frequently not even this evident. It takes a long time for stress fractures to show up on x-ray, and frequently the person, if they don't discontinue training, goes on to have a frank fracture in that area, so we have come to rely increasingly on bone scans.

These focal hot spots in the bone of the leg are indicative of a stress fracture. We began to wonder about bone scans as a mode of diagnosing stress fractures, back in the mid-'80s, when the Israelis were reporting rates as high as 35 percent in their elite troops, and so, in 1989, we did a study, and many of those were asymptomatic, so we did a study in 1989, to look at bone scans in normal, asymptomatic male trainees in the seventh week of basic training.

Actually, we had so many volunteers that we had to randomly select a smaller group that we could manage on the bone scanning equipment that they had at Fort Bliss. In any case, what you see here is, in normal, asymptomatic, uninjured trainees in the seventh week of training. Ninety-six percent had one-plus bone scans, 60 percent two-plus, 14 percent three-plus, and two percent four-plus. This was reported in an abstract of the Orthopedic Research Society last year, and should be coming out in the press sometime soon; I'm not sure when, though. And that's Colonel Tom Scully that did that study.

What we've seen mostly here are the results of epidemiologic research. I would submit to you that research is only one element of a comprehensive program. This is that list of critical elements again: surveillance, research, prevention strategy, development and testing, program implementation and monitoring. The

ultimate goal of all elements of the program are injury prevention, or, as General Kerr (phonetic), the outgoing commander of the Army safety center, puts it, it is force protection.

What I think we can conclude, safely, from what we've seen today, that injuries are the lead cause of morbidity in the Army. I suspect that they are, if not the leading cause in the other services, a leading cause. We can identify risk factors. Finding risk factors, however, is not the same as having prevention strategy in hand. We need to test our strategies. We certainly need to monitor our programs, whether we test the strategies or not.

It's also evidence from what you've seen that there is certainly an infrastructure for surveillance, and I would say that the infrastructure for a comprehensive injury control program exists, but that program lacks integration.

What I'd like to close with is a conceptual model that I began working on, in trying to decipher what the medical command's role in injury, surveillance, prevention and control would be. I'd like to emphasize that, while this graphic doesn't emphasize it, the safety center is really critical in all of this. The safety centers of the three services are responsible for policy, procedures, and standards. They're also responsible for integrating safety and risk management into training,

doctrine, acquisition of materials, sustainment, and combat operations, and they have the links with the line to do this, because the place, I believe, that injury is going to take place is at the local unit level, down here at unit and installation commanders' levels, and the safety center already has the network of communications with them.

What I would submit to you is that that center is not well-linked to other potential sources of valuable information, medical surveillance, among other things, and medical research. Medical research in the injury area doesn't frequently communicate with even our own surveillance sources, such as the hospitalization database.

One of the questions that I see, especially during the downsizing and diminishing resources, is how can we cost-effectively interlink the various surveillance and programmatic sources that we have for injury control, and with that I would like to close. Thanks.

PRESIDENT DOWDLE: Thank you. Would somebody get the lights there, please? Thank you very much, Colonel Jones.

What I would like to suggest is that people make a note of their questions that they might have, keeping in mind that we also have a question on this issue, and why don't we then go ahead to the presentations from the other two services, and then come back to general questions, so

please make a note of questions you'd like to ask here.

Let's move on, then, to the Navy, with Lieutenant Commander Shaffer.

(Pause.)

RICHARD SHAFFER, NAVY HEALTH RESEARCH CENTER

MR. SHAFFER: Good morning. My name is Rick Shaffer, and I'm from the Navy Environmental -- or Navy Health Research Center. Admiral Nelson got a chuckle out of that. He was my CO at NEHEC (phonetic), when I was there.

I'd just like to start off by saying we have some exciting research going on at the Naval Health Research Center currently, in injury research and training, mainly in training populations. The program we've got, the work being done, is out of the clinical epidemiology division at the Naval Health Research Center, of which Captain Brodine is the head, and I'm very excited to have been there in the last year-and-a-half.

This is the first opportunity that I've had in the Navy to work in such a well-rounded group on epidemiology. We have Captain Brodine, and Commander Greg Gray and myself, and a well-rounded staff, and we've had the opportunity in the last year-and-a-half to really try to put some real sound epidemiological principles to the effort of looking into injuries, both in training populations in the Navy, and in the Marine Corps.

This isn't just a Naval Health Research Center

effort. We've put a lot of extreme effort, especially on Captain Brodine's part, in trying to put together a multidisciplinary group, to try to get a civilian-military clinical research-based research team to put into this, and we have put together a team of collaborators from various universities, military units, clinical assets, which we are very excited and very privileged to work with, and it's been something that has made our research extremely possible.

Also in the San Diego area, we have quite a bit of training and military population going on here, but just to make sure that the people that have come from out of town don't think that we're weenies, we do have research out in the northern and eastern part of the country, where it's cold right now, so we have something at Great Lakes in Chicago, which we'll be an overuse tracking system there shortly; Quantico, Virginia, Parris Island, South Carolina. We do have some work going on in Orlando, Florida, which I'll talk about very briefly. What we have, though, here is an ideal situation for working in injuries in active duty population, because of the locality, and the large amount of Navy and Marine Corps assets here in the San Diego area.

The problem that we have here is an impact in two proportions to military readiness and training populations. In the last year alone, at MCRD San Diego, which we have the most specific data on, we've been able

to show that there are two extreme impacts to the cost of injuries in training populations and operational populations. We've been able to show that, fiscally, training injuries alone at MCRD San Diego have cost the depot over 16-and-a-half million dollars, in terms of separations due to injuries and lost training days due to injuries.

The lost training days, the Marine recruits have tallied up over 33,000 lost training days, in just one year alone, and that's just at MCRD San Diego. We have evidence to think that the same thing is going on at MCRD Parris Island, and other places such as the BUD/S, the Seal training base here in San Diego, the follow-on training for the Marines, Navy boot camp. All of these have the potential to have just as significant impact due to injuries as they do here at San Diego. I wanted to put that out as one example of what we think the problem and the impact is.

So my purpose here today, the way I understand it, is to provide a little bit of information from the various difference sources that we have in the Navy and the Marine Corps, to give some kind of emphasis to what we consider to be a very significant problem for training active duty populations, as well as from the readiness point of view, and just from an overall wellness point of view, in injury prevention.

I'm going to go into three very quick areas in

the next 15 minutes or so, and talk about just a smattering of hospitalization information that we've got to support some of the trends that we're seeing, some accidental acute injuries that we see at the training depots. I break accidental acute injuries down into those non-training-related injuries, such as falling in the mess hall or getting hurt in the barracks, and then comparing to that injuries that are acquired during training activities, not necessarily physical fitness training activities, but all training activities, at the various training sites.

Then I want to talk just briefly about the overuse injuries that we're seeing, and the types of injuries that we're seeing, and then, lastly, I want to go in, just as an opportunity for us to promote our research a little bit, what we're doing at the Sports Medicine Research Team here at the Naval Health Research Center.

This is somewhat unrehearsed from what Colonel Jones did, but he and I have come up with very similar information, in fact, working together on the DoD injury surveillance working group. We have seen the same trends in many of the services. Just as an example, hospitalizations in the category of accidents, poisoning and violence among active duty Navy enlisted personnel has shown a definite decrease, and hospitalizations due to what I would call other than training or military active duty causes. The majority of this category is accidents.

The poisoning and violence category is a portion of it, but it is not a major portion of the decrease.

So we are seeing a decline in hospitalizations for accidents, poisoning and violence in the Navy. Similar information is indicated in the Marine Corps. We are, at present time, at the Naval Health Research Center, putting together a database very similar to this for the Marine Corps, hospitalizations, and we hope to be able to provide the same kind of information from that, very shortly.

MS. HANSEN: That line reminds me very much of the civilian situation.

MR. SHAFFER: Yes.

MS. HANSEN: How much would you attribute to simply altering practice, and alteration of hospitalization practices?

MR. SHAFFER: Yes, ma'am. From what I understand, there's two reasons for this decrease. One is the emphasis on the safety, particular safety kind of practices, as Colonel Jones pointed out, and decrease in motor vehicle accidents, seat belts, those kinds of things, along those lines, and the other thing is, just as you say, there's a definite change in hospitalization practices, from my limited information in the hospitalization area. In the overall group, as I said, we're mainly in the training injury information.

The same types of trends are being seen in the

civilian community, and it's not a surprise to us, and I don't think it's really a surprise to anybody working in this area, and this is something that we are in the process of breaking out further, to see exactly -- we have cause codes on all these hospitalizations, and information on how the injuries were cause, length of hospitalization time, and I think that we probably will see a mimicry of what's going on, very simply, in the civilian community.

Secondly, the one thing that's very important to point out, and we make an effort to do this whenever we're presenting this information, because the line community has been overly supportive in what we're trying to do, and the thing I always want to make sure is very clear is that we consider the military training programs to be extremely safe. These are very safe programs. The amount of injuries and accidents in these kind of programs is extremely small. The line community and the training community do an outstanding job of working, with every effort that they can, with out input, with safety center input, with training expertise input, to make these programs as safe as possible, and I want to make sure that I've made that point, that we consider these programs to be very safe, and we're not trying to make a point at a flaw in training.

We're trying to provide some additional information that can help them decrease their loss of readiness time, and their costs, because their main goal

is to provide a complete, finished, well-trained Marine and Navy recruit, and so, like I said, the point is to make sure that I don't be misconstrued as saying that this is a training flaw.

UNIDENTIFIED SPEAKER: May I interject just a little bit, Rick?

MR. SHAFFER: Yes.

UNIDENTIFIED SPEAKER: If you look at the rates of injuries in the Marine Corps and the Army, they are very similar to what we see in civilian high school and collegiate athletic programs, and they're intermediate between events like cross-country and track and football, so I think that that corroborates what you're saying about these programs being safe, when you consider what goes into them.

MR. SHAFFER: Yes, they're extremely safe, and we always are very careful to make that point.

I wanted to start out, just as an idea, we've collected injury information from acute injuries, other than training injuries, at MCRD here in San Diego, and this is from all injuries of any kind other than training injuries, and you can see the incidence of injuries, and this is over a one-year period, over 20,000 recruits, is very, very low. There's a very low incidence of the injuries that we probably think of as acute or accident-type injuries, so I want to make a distinction between the acute accident-type injuries, non-training injuries, and

the injuries that I'm about talk about. You can see that all injuries is less than one percent, an incidence of one percent in a very large population, at MCRD San Diego.

The overuse injuries is where we're focused right now, and one of the ways that we're doing that, as Colonel Jones alluded to just briefly, is we're trying to develop a large sample-sized database of outpatient training injuries, and the way we're trying to get at that, we have developed a computerized automated tracking system, that's essentially managed here at the Naval Health Research Center, and we have now installed it at all but two of the sites it has been planned for, and it's providing us a huge data set of outpatient injuries, and from we understand it's one of the first outpatient tracking systems for injuries in the military, and we're getting some outstanding information from this.

The MCRD tracking system has been around the longest. We have about 25,000 visits for outpatient injuries, that is giving us a possibility to look at very specific injuries with some great deal of confidence.

Having said where we get this information, just some selected sites that we've seen so far, and an idea of what the impact, or what we're seeing for training-related injuries, in various sites, and I've listed just a few of the ones that we have seen. We have research going on at this special warfare center at BUD/S, where the Navy personnel go to become Seals, and then we also have

information from the two MCRDs, males and females. Obviously, the only female information comes from Parris Island, MCRD Parris Island.

Then we have some preliminary information from Navy boot camp, male and females, coming from the tracking system which has just begun, since October, at NTC Orlando, and you can kind of get an idea of what we're seeing. Basically around a third of the recruits or the trainees at the more arduous training programs, such as BUD/S, are being injured, and this is for one or more injury, and many people do have a second, third and fourth injury, and that's accounting for a lot of costs, a lot of lost training time, and a lot of just plain not ready to perform their duties.

MCRD San Diego is about 25 percent, compared with about 29 percent at MCRD Parris Island, in males, and then of interest her is that MCRD Parris Island females have not quite twice the rate that Colonel Jones has seen in the Army, but it is definitely higher, and we are in the process now of putting together information for the females at MCRD Parris Island, and hoping to do some further looking into what's going on there.

NTC, the Naval training, recruit training, obviously has a shorter time period. It's seven weeks, versus the 11 to 12 weeks for the Marine Corps, and a little less arduous. The injuries there are occurring at about four to five per thousand per week, and so the

overall percentage of people going through training with an injury is about seven to 11 percent in women, in the Navy boot camp, and we hope to corroborate that information from NTC Great Lakes.

The types of injuries that we're seeing are training injuries, and, as Colonel Jones pointed out, many of these are somewhat minor injuries, but they do account for a significant portion of lost training time and costs, depending on if they delay training, if they cause separation, and if they just simply put somebody back into another class. Most of these injuries, about 80 percent of them, result in at least a day of lost training time.

The information of note at the bottom of this particular one is stress fractures. The average downtime for stress fractures ranges anywhere from 40 to 75 days, compared to some of the smaller, two and three days, for some of the other more minor injuries, but this is a significant cost. MCRD San Diego has a cost to stress fractures of over $4,000,000 a year.

In the two Marine Corps depots, both San Diego and Parris Island, for men, we see a similar type distribution, with tendinitis being the highest incidence of injuries during training, but here you also see a very small percentage of the injuries due to stress fractures, but those are by far the largest proportion of the costs, in training downtime.

In females at Parris Island, we've seen a

similar situation, except for a slightly higher incidence in all of the groups, the tendinitis being very high, and we hope to be able to look further into that, and get some explanation of the difference, whether it be flexibility or fitness difference. Stress fractures there don't differ very much from men, and that's also of interest, as to why that would be. We may have expected that to be -- and that includes all lower extremity stress fractures, including pelvic stress fractures.

As to anatomical site, what we're seeing, we see the majority of these injuries are knee and lower leg injuries. I have excluded from this such things as blisters, tinea pedis, ingrown toenails, which are significant in the training populations, and that's why the ankle/foot category is not higher than the knee, but when you look at just injuries that are costly as far as training, the highest proportion is in the knee and the lower leg, followed by ankle/foot, and this is pretty consistent between the two MCRDs, in males.

In females, you see about the same frequency ranking, but just a higher incidence, and that would also go along with what we've seen. There's a higher percentage of those individuals being injured during training.

Lastly, I just want to talk a few minutes about the research that we're doing here at the Naval Health Research Center. A lot of it is going along the same

lines as what Colonel Jones is trying to put together for the Army. He and us have worked very closely in trying to cooperate in what the services are doing, and we have a strong interest in trying to make an overall military injury program that's every useful, not only to the military, but to the civilian sports medicine and civilian injury information.

What we have at the Naval Health Research Center are basically three research projects going on right now. The core of the project is the tracking system that I have mentioned briefly. That's to act as both a baseline and platform for further research, and using that as a platform we now have two prospective studies going on, one at MCRD San Diego and one at the Special Warfare Training Center here in Coronado, or in San Diego.

The purpose of these programs is threefold. The goals are to determine the rates of injuries in the various training populations, develop predictive profiles of injury susceptibility, which we feel is also going to be a spectrum of different injury risk factors which we are also putting together, modeling to show what we found in that area at this point. This is actually ongoing right now, and then to develop and evaluate intervention programs. Our goal is to work very closely with the training staffs, to try to provide them some useful and practical information on things they can do to reduce this impact of training injuries.

The tracking system, as I said, is a new area that we're trying to use, and we're using it as a baseline to do further research. Hopefully this summer we're going to be doing some on the officer candidates, and the basic school at Quantico, and we're using it here at San Diego, the Naval Special Warfare Center, to provide us good, large-sample size rates.

It's an automated tracking system. We provide the PCs and the software, support the software through our office, and the data is all centrally managed at the Naval Health Research Center, and we've made an administrative -- for the clinics, so that the clinics get a great deal of use out of it, in their injury tracking, their visit tracking, their provider usage, and so we've tried to integrate it as much into the clinical practice as we could.

The two prospective studies which are probably the most exciting thing going on right now at MCRD and at BUD/S, for us, are two studies with different populations, different training, and different amount of time of follow-up. We are enrolling injury-free subjects at the beginning, basically day one or day two of these two training programs, and then we're looking at different types of baseline information on all of them, and putting together a profile of who's coming in, and then sitting and watching them for the three-month follow-up at MCRD San Diego, and the six-month follow-up at the Special

Warfare Training Center in Coronado.

The most intriguing thing about MCRD San Diego is the sheer volume of personnel and injuries that we are able to deal with there. We can get a large sample size in a very limited period of time, because we have a mechanism set up now that has enable us to enroll subjects without in any hindering the training, and have worked ourselves into the training process there at MCRD San Diego, and the same thing with BUD/S, as well.

The information that we're gathering on these is obviously a multitude of different ways of collecting it, and different background information. We're collecting questionnaire-type information on prior running history injuries, different fitness levels, fitness practices. We're getting initial strength test scores, which is the first physical fitness test when they come in. We're doing physical measurements, anthrometric (phonetic) measurements for flexibility, range of motion, body measurement, body size.

We work in collaboration with Childrens' Hospital here in San Diego to provide some motion and gait analysis, motion analysis. They're looking at dynamic motions, or dynamic measures of body biomechanics, and we're looking at bone structure, using the dexatometry (phonetic) and bone densometry (phonetic), and collaborating with Johns Hopkins in trying to put some idea of bone geometry and relation to stress fractures and

other overuse injuries.

We're also getting diagnosis information through the passive surveillance efforts, and we are also now employing some active surveillance efforts, to try to go out and reexamine the people in our study at the end of their training time, to try to see if we can find any other injuries that they didn't report, either because of a pride issue or not wanting to be washed out of the training. So there's a wide variety of information that we're collecting in order to develop these profiles.

We then have some intervention plans that we're trying. We're looking at pinpointing training activities, when during training do these particular injuries occur? With the large sample size that we have, we're able to get down to the very specific injury. We're looking to evaluate the relationship of preconditioning and IST scores, maybe provide some information as to before coming to the training program is the way to reduce your risk of injury; develop body structure profiles, using motion analysis, the static measurements that we're doing at MCRD, in conjunction with those other measurements done at BUD/S, at the Naval Special Warfare Center; and then we're also looking for predictive profiles in specific injuries, in those trainees that separate.

In conclusion, the point that I feel we wanted to make is that the Navy and Marine Corps are also putting a great deal of emphasis, as far as we're working it, in

trying to get a handle on what the impact and distribution of these kinds of training injuries are, as well as then work very closely with the training staffs and training units, to try to help them reduce these injuries, which is the overall goal of our research program.

PRESIDENT DOWDLE: Thank you. Can we have the lights, please? We would like to go ahead and complete these three presentations, and then ask questions at that time. Could we move on, then, to presentations from the Air Force? Major Liu.

BOB LIU, UNITED STATES AIR FORCE

MR. LIU: Hi. I'm Bob Liu, from the Air Force. My talk is a little different than the other two previous talks. We'll just focus on mortality and morbidity, and not concentrate too much on the details that the other two talked.

I'm from Brooks Air Force Base, and this is pretty much of a rough first-glance look at some of these issues concerning mortality and morbidity of the Air Force, and I just concentrated on the active duty population, so it's really not refined, or the final word, concerning these subjects.

There were two data bases that I looked at, the casualty database and then the inpatient database, which Colonel Jones had mentioned before. The casualty database is fairly solid data, but the inpatient database is soft, which we'll get into a little bit more.

casualty assistance. All death certificates are reported there, at each base, CDPO, as a consolidated base personnel office, and it's centrally reported to Randolph Air Force Base, and there's fairly good incentive in census to report death certificates there, because next of kin are eligible for some death benefits when an active duty person dies.

On this database, reporting from 1980 to 1993, these are the leading causes of death among 5,717 deaths during this period. Looking at this, you can see that automobile deaths are the number one cause of death, and then, if you combine automobile and motorcycle deaths, that's about 30 percent right there, and, looking at the other -- and heart attacks. Those are sort of the medical illness. They combine for about 38 percent of the deaths in the Air Force active duty population, and the other category is sort of cancers, respiratory illnesses, strokes, when you break it out by years, showing the number of deaths over the 14-years period.

Epidemiologists, preventive medicine people, we wonder if maybe this is due to the downsizing of the Air Force, so I went to the almanac issue of Air Force Magazine to see the active duty strengths during each of these years, and indeed you see that the death rates seem to be declining, starting around 10 per 10,000, and ending around five or six per 10,000, for each year.

Plotting out the leading causes of death for each of the categories, automobile deaths, you see that it's the leading cause of death, and it seems to be declining, also, and the other categories seem to be declining. Suicides seem to be flat over this 14-year period. Each of these blocks are now grouped in two-year categories. Also, the military aircraft deaths are declining also.

This slide summarizes the next six causes of death. Heart attacks seem to be declining a little bit, except for those last '92 and '93 periods. Motorcycles deaths seem to be declining, also. Death rates due to drowning seem to be declining. Homicides, there's one bad year, but maybe it's staying steady. The category for civilian aircrafts might be steady. Then this is deaths where a pedestrian may be hit by an automobile.

This next group, distribution of deaths, Doctor Parkinson and I did a paper in a recent American Journal of Preventive Medicine, reporting alcohol-related deaths. In 1990, there were half-a-million people in the Air Force, 291 deaths, active duty deaths. Fourteen percent of the people in the Air Force were females; this only comprised about three percent of the deaths.

This is the alcohol portion of that paper. In 1990, there were 92 deaths due to motor vehicle accidents. There was blood available for about 83 percent of these motor vehicle accidents, and about 49 percent of these

deaths involved alcohol, 49 percent of the 76. In 1990, there were 51 suicides. There was blood available from 82 of these suicides, and about 38 percent of these 42 involved alcohol.

Switching gears, that was the casualty database. Now, there's an inpatient database, and it includes factors like demographic information, ICD-9 codes, and the injury codes, there's no E codes here, and there was previous allusion to the STANAG code, which is a NATO code. It's called the Standard NATO agreement, and it classifies trauma to the class of trauma and the causative agent.

There are holes in this database, and that's why it's sort of a softer way of looking at some of these issues. Not all military treatment facilities report on this database. Maybe about 40 percent have access to this database, and most of them don't even have inpatient clinics, or don't have access to this.

Looking at the various years from this database, I asked the biostatistician to list for me the top 10 causes of death, by ICD-9 code. In 1986, the casualty of people listed 436 deaths, and then from the top 10 ICD-9 codes came 122 deaths, so this is really 28 percent of the deaths, so keep this in mind for the various years, as I report data from these top 10 ICD-9 codes. It's maybe only a quarter or 20, 30 percent, lower than 11 percent in some years, and this was taken as a primary ICD-9

diagnosis.

So, from this inpatient database, looking at ICD-9 codes across the bottom, open wounds were the number one cause of death. Cardiac arrest was the number two cause, then sort of injury, other, and ill-defined injury. I'm not that familiar with ICD-9 coding, but there were 576 deaths in this eight-year period, and the last couple of months of '93 aren't included when this was run, maybe the last two or three months, but there's only about 22 percent of the deaths during this period, compared with the casualty database.

You can see some of these ICD-9 codes are similar with the 800s here, 900s, and then 400s, so I grouped them, and the 800s and 900s are fairly similar. You can even sort of lump those together as one principal diagnosis group. Looking at the injuries, just for the top 10 ICD-9 codes -- comprises about 75 percent, three-quarters of the deaths, and the other quarter is circulatory-related.

When you look at rates for each of these categories by year, this seven-year period, now it looks like injuries are maybe on the decline, also, and also some of the circulatory deaths, for just these top 10 causes.

That was the mortality bit, and I'm going to switch gears to morbidity, and there's some problems when you look at the inpatient database, to sort of generalize

for morbidity. The inpatient database doesn't account for readmission, so if someone were admitted for injury X, and then got discharged and readmitted for the same injury, you'd get two counts for that. It doesn't account for transfers. A lot of folks are transferred to higher-level hospitals, Air Vac, and looking just at inpatients for morbidities over-represents the incapacitating conditions, too.

So don't really have faith in the actual numbers, but sort of look at the general trends, when I show these next few slides. We don't really have a widely adopted outpatient database in place, although at our boot camp at Lackland we're getting close to one.

Looking at overall hospitalizations for this period, from 1980 to '92, you can see that the case rate for hospitalization has been decreasing, and, as mentioned before, maybe this is due to closing of some hospitals, hospital beds, and even clinical practices, too.

Also keep in mind, the Air Force, I'm not sure what the Navy and Army have, we have a category called "quarters," and if an active duty troop were to be sent home on quarters, it would be as inpatient, but we tried to block this out when we present this data, so quarters data is not included in these slides.

When we looked at the number of hospital admissions, we had a category called "non-effective rate," which took in the number of days a patient has been

hospitalized, and that seems to be declining over this time period, also.

You can look at this inpatient database, and I've mentioned this NATO injury code, and these are the top four groupings in these NATO injury codes. The top one is motor vehicle accidents, seems to be declining. Athletic injuries, sort of steady, and the falls may be slightly declining. This is an interesting category that they report, complications from medical or surgery; it seems to be maybe the iatrogenic problems here may be increasing here.

Then, when you look at the non-effective rate, taking the bed days into account for these groups, everything seems to be fairly steady, except for this motor vehicle accident. Bed stays have been declining.

Then, as Colonel Jones had mentioned, you can lump some of these ICD-9 codes into what they call "principal diagnosis groups." There are 17 principal diagnosis groups, and the number one cause for hospitalizations in this principal diagnosis group is because of digestive disorders, and then the number two cause is injury, and then musculoskeletal is buried in there, and pregnancy is sort of about the same there, too.

Then, when you take hospital days into account, mental illness seems to be number one, leading everything else, for the number of maybe lost work days, you might interpret this as, but all the others are sort of all

grouped together in here, digestive, pregnancy injury, musculoskeletal. It was interesting that the mental didn't even show up on the previous slide on the number of hospital admissions.

MR. CHIN: Excuse me. What's included under digestive disorders?

MR. LIU: I didn't look specifically, but I would imagine things like gastroenteritis.

That was actually the end of the talk, and maybe, since I said this was just a first pass at the data, things that we could look further at is, for the age and sex distribution, maybe adjusting for age and sex, also, so that we can compare our rates with the civilian population, too.

I didn't make enough copies for everybody, so if you want a copy of this, see me, and I have a few copies.

PRESIDENT DOWDLE: Thank you. Thank you very much. Okay. Why don't we open, then, all three of these for discussion, and any comments that the Board and anyone else may have, and we have lots of hands up, but I think Barbara is dying to say something. Please, Barbara.

MS. HANSEN: First, I'd like to commend our presenters, because I really think the data we're being presented is a whole lot better than the previous version a couple of years ago, and I think this analysis is going to lend itself to careful rethinking of our training processes.

I would like to call attention to one side, I think it was Lieutenant Commander Shaffer's presentation, the one in which the Navy program showed a seven percent and an 11 percent male-female injury rate, and on the same slide, to the left, I believe it was a BUD/S or a Marine program, showed a 33 to 45. Now, most of the rest of the presentation focused on individual characteristics, which my intuition would say would have been biased in the opposite direction, meaning that the greater fitness and the lower injury rate would be in the Marine as opposed to the Navy recruit.

That would be a bias, perhaps, but nevertheless I would guess that, and yet we saw just the opposite, so I guess I would urge that the two specific programs that are at either end be carefully analyzed, to look at the causes that are systemic in the differences between those two programs. The only one mentioned was the duration, seven weeks versus 12 weeks, but I have a suspicion that it's not just duration, and that there really is a need for some careful cost-benefit ratio analysis of the training process. PRESIDENT DOWDLE: Thank you. Any of the three want to respond to that?

MR. SHAFFER: There's many factors, and probably the most important one, though, is the drastic change in activity that happens when you go to Marine boot camp, versus when you go to Navy boot camp. The change for 18, 19-year-olds, and some possibly and usually somewhat

individuals, going into the more arduous MCRD Marine boot camp, versus going into the non-quite-as arduous, and I won't even say easier, Navy boot camp, it's very significant. I've noticed that quite -- both of the boot camps, and look at the training population and the training program.

There's really no comparison, so we don't even make an attempt to make those comparisons. The purpose was just to kind of show, in selected Navy and Marine Corps training populations, what we have seen, as far as -- injuries, but you're exactly right. We have no intention of lumping those kind of trainings. The BUD/S, as well, the special warfare training; we're not having any intention of lumping that kind of training with Marine Corps boot camp or Navy boot camp, or the officer OCS Marine Corps training.

So they're very, very different training programs, with very different injury rates, very different kinds of injuries, and that's exactly our purpose, that you have these things taken very separately, because there is a big difference. Marine boot camp is very different; it's longer and tougher.

MR. JONES: I'd like to second Commander Shaffer's agreement that training is really where it's at. Training is what causes injuries, but it's also the hardest factor to get at, because there are a lot of variables in training, duration of training, how intense

is the training, you know, and there is some training that's more hazardous than others. If you're mountain-climbing, that's a different kind of hazard than if you're climbing over obstacles on an obstacle course.

In regards to the specific rate that you were commenting on, the 45 percent, I believe, in female recruits, that is a very high rate. It's not radically different from what we see in the sports world. In fact, just last year at the American College of Sports Medicine, a group from the University of Seattle has been running a surveillance program in that area, and the most hazardous event that you could participate in high school sports turns out to be girls' cross-country, and the amount of morbidity, not just in terms of incidents, but also in terms of time of recovery, was higher.

So what we see in our populations is not radically different from the civilian world, and I would submit to you, as you were suggesting, that a close look at training, and tailoring the training to the population that's coming in, may be a way of preventing injuries.

In the Army the rates that you see, the training for women is very similar for men. They allot a certain amount of time for things, and so the only difference between male and female trainees is that they may not be able to do the same number of pushups in two minutes, and run the same distance, or run as fast for two miles, but basically the time allotments are the same.

Now, at Parris Island, I believe that the training for women is somewhat different than it is for men, and that they try to take that into account. In fact, the risk ration for women and men is lower, and it's probably because they've taken that into account, and I take that as a suggestion that we could tailor programs to decrease those rates in women.

PRESIDENT DOWDLE: Doctor Chin?

JIM CHIN, SCHOOL OF PUBLIC HEALTH, UC BERKELEY

MR. CHIN: Two questions. One, when you look at overall mortality in young adults in the United States, it's fairly low, and then, when you look at cause-specific mortality among young adults in the United States, it's primarily, I think, trauma accidents, et cetera. I'm just wondering, has anybody really taken a look, to look at the civilian sort of mortality and cause-specific mortality, in relation to the military? My suspicion would be that probably overall the military is lower, compared to civilian.

MR. LIU: It is, as a matter of fact. I have some slides that I can show you. Basically, what those slides show is that, for unintentional injuries, the overall rates in the Army and Marine Corps are about the same as they are in the civilian community, and headed in line to meet the year 2000 objectives. The Air Force and Navy, the rates are actually lower than they are in the civilian community. If we look at homicides, our rates

are significantly lower. They're about half what they are in the civilian community. Suicide rates are also lower, and they already meet the year 2000 objectives for those two things.

MR. CHIN: I make this point primarily to point that, within the military, you're really focusing on, say, a major cause of deaths and morbidity, but, compared to the civilian community, you have much lower rates, so it should be looked at from that perspective, I think.

MR. JONES: There was one look at suicide for a period, in the Air Force, because there were 10 suicides in one month, October of '92, and that's the only deaths that they compared to civilian, and it was about on par with the civilian, but I'm not sure whether they really age-adjusted that data, either.

PRESIDENT DOWDLE: Okay. The second question?

MR. CHIN: The second question really is that you have certain types of training programs, different for females than males, and all of the data would suggest that individuals who come in in poor physical shape do worse, or have more injuries. Is there any consideration in developing specific programs to get individuals up to speed before they are all put through the same kind of program?

MR. JONES: The Marine Corps, I believe, is encouraged to coach people, and they actually engage in a program before they come in. The Army does not do that.

I think that, overall, the rates in the Marine Corps are lower, probably, as the result of having a higher level of fitness when they come.

There's a perennial problem with this sort of thing, and that is that you have to function in groups, and to try and conduct individual training in populations that have limited resources, in terms of supervision, it's very hard to do, unless you do ability groups, and they've tried that sort of thing, but the bottom line is, when you spend a half-hour of running a day, the low fitness group is going to end up with more injuries than the higher fitness groups.

Another approach that might be taken, with the downsizing, is greater selectivity. We might be able to select the people who are less likely to have injuries at this point. I don't know even how feasible that is, but it's certainly an alternative.

PRESIDENT DOWDLE: Let me get Doctor Karol, then I'll come back to the other side.

DOCTOR KAROL, UNIVERSITY OF PITTSBURGH

MS. KAROL: Back to this male-female difference, in view of these differences in incidence of accidents, could you tell us something about the participation of women in the preventive strategies, for example in the foot brace development? Is there consideration for the differences between males and females?

MR. JONES: In the ankle brace study, we did

have women in the study. I can't even remember right offhand what the percent of women in that study was. It was low, but not that much lower than, I think, the distribution of women in the Army. I think it was maybe nine or 10 percent, something like that. I can't tell you what their rate was, in that particular study, and probably the numbers were small enough that we wouldn't be able to rely on it, anyway.

MS. KAROL: But strategies are being developed for women, with special emphasis on women?

MR. JONES: I can't speak for all strategies. You know, the strategies are broadly applied to everybody. It's of note that the safety centers do not tabulate their data by gender, and also some of those databases don't even collect data on race. The safety centers don't. The hospitalization databases, of course, do, but that is a deficiency. The rates that are generally reported are for the population as a whole, and they aren't broken down by gender, age or race when they're reported, which is one of the deficiencies that I think we need to rectify, and I think the Healthy People 2000 goals really give us the impetus to start looking at these by different groups.

Not only that, very fundamentally, these rates have traditionally been reported as frequencies, and not as rates, and even though the general impression that one has is that there are downward trends in all these things,

it does make a difference if you report a rate, as opposed to a frequency, especially in the downsizing environment.

So you've hit on an issue that's very close to home, and touches on a lot of things, and that's the need to look at specific risk populations, women being one of them.

PRESIDENT DOWDLE: Doctor Ascher?

MR. ASCHER: Beginning to formulate our response, and having been through this from the beginning, in terms of the exercise program in the service, personally, I wonder if we could think of the injuries we've heard about in three categories: the basic training type of injuries, the sports injuries that occur in activities that we encourage people to do, and the third is the ongoing injury and chronic injury that may be associated with the continuing requirement for the physical training of the general active duty.

The three are really different, completely, in the way we think about them. In the first case, where you have boot camp or other things, you could say that you could optimize that by saying, "What is the cost benefit of how many miles you run, against tendinitis, and where does the curve go, and what is the point in time where it no longer pays to make people run that far?" You could optimize those. That would be fairly easy, and that would be very gender-specific, and be very important.

The second category, sports, I recognized, on

active duty, that the bases were encouraging sports that had a lot of injuries, and that could be very carefully looked at, that, you know, softball is notorious, and you should be aware that it's important to have things for people to do, but we know that bicycling is safer than running, and things like that.

Then the third is, I'm speaking anonymously, I was on active duty when the mania for exercise hit the services, and it was very apparent from the beginning -- I'm being sort of subtle -- that somebody had the idea that this was very good, to take a lot of sedentary people out and make them run around, and it was obvious to anyone at the time that it was a bad idea in many regards, particularly from the gender standpoint, that you took women, whose job description really required no running, had never run in their life, had never done a situp, and didn't even know what a pushup was, and you put them through a program that is really inappropriate, and we've heard before of the morbidity of this program.

So I'm wondering if we could, in our discussion, dissect these three components, and talk specifically about the appropriateness of the ongoing hour-a-day go out and run for everybody on active duty, and I'll quote our previous experience that we heard from the Air Force, that the assessment capacity, through bicycles and other techniques, to just measure general fitness, without the stress on the joints, without the lost time, is really

appropriate, I think, at this point, and I'm wondering if we should still have all these people running around. I go to bases all the time, and you just see these people running around. Just the amount of time that's spent seems incredibly ridiculous.

PRESIDENT DOWDLE: Colonel Parkinson, not only did you have your hand up, but this is a perfect opening.

MR. PARKINSON: I'm not sure if it's an opening, or a trap door. I don't think I'll respond to that, necessarily.

Let me make a couple of questions, and a comment, particularly Bruce. What proportion of Army injury hospitalizations did you find to be essentially E or STANAG coded, in your analysis? I mean, when I looked at this, and I know that Bob would probably confirm, I would say we're very low, on the order of 10 to 20 percent, which means that whatever we're getting for etiologies is very biased in the Air Force. I'm wondering what the Army's experience is.

MR. JONES: In that category, if I recall right, in fact I asked the IPDS, the Individual Patient Data System people, to tabulate what percentage of the eight through 900 series were E-coded, and it was about 90 percent, but the musculoskeletal condition category, which is largely the result of injury, but its chronic -- effects of injury, only 10 to 12 percent were E-coded, and so there's a problem in our database, also, in capturing

that data.

MR. PARKINSON: One of the things, I think, that really cripples this field, and we talked about it earlier in a different form, when we were talking about Desert Storm, is the lack of consistent codification or nomenclature across the services for analysis, epidemiological analysis, and I think one of the main efforts of the work group, I hope, will be looking at existing E codes, see where they apply and where they don't, and what are going to be the keys for the typical nosologist who codes at our NTS (phonetic), to put this information in there, as a general issue.

The other point that I'd like to make, concerning the civilian comparison, one of the things that we wanted to do when we did the alcohol analysis was to compare our actual autopsy blood alcohol with the CDC projected alcohol-related proportion, or alcohol-attributable fraction, for injuries in those categories, and, interestingly, those numbers that you saw, in about 50 percent of motor vehicle accidents, and about 38 to 40 percent for suicide/homicide, tracked very nicely, which was largely civilian data, so it would seem to suggest the same factors in the civilian sector are playing out, at least in a small number, as it relates to alcohol and injuries.

The final point has to do with the business of fitness testing and what is an acceptable rate for people

who volunteer to throw themselves out of airplanes, when it comes to injuries and things like that. It's an interesting question, because the GAO has been asked, or basically the services have just been asked to comment upon a GAO report, in the wake of the Desert Storm experience, that I'm sure the Board would like to review, in the context of this subject.

Basically, I think it was largely the Army, found that when the whistle was blown and the flag went up to deploy large numbers of people to the Gulf, that the fitness assessment programs largely were either not operative in the reserves, or that people couldn't actually do their jobs, and so this triggered Congress to ask for a GAO report, in the whole business of fitness assessment and periodic monitoring and programs.

It's not too much of a leap beyond the charge to the Board on injuries, to look at that report as well, and I think that's something that I'm sure Colonel Peterson can get you all to look at, because we have to respond to it, and for the most part I think the services have largely kind of agreed, although there's a big issue, as Bruce will note, on what is and is not a training injury. That whole issue is another very volatile political issue right now.

PRESIDENT DOWDLE: Thank you. Captain, did you have a question that you wanted to ask?

MS. BRODINE: Well, I was going to make a

comment.

PRESIDENT DOWDLE: Yes, please.

MS. BRODINE: It pertains to some comments that were made earlier. One comment I wanted to make was that we're a relatively new effort. We've been doing this for the last two years, and the first year was developing the tracking system itself, and that addresses one of the issues you brought up, which is comparability of data, and we're using the ICD-9 orthopedic code with some subcodes, but it can be collapsed back to a common ICD-9 orthopedic code, so that we can make comparisons across all these populations.

We recognized when we started this that there were going to be differences. The training populations each have different training exercises, different requirements, different lengths of time that they have to go in, and that's why we have a broad-based surveillance system, which ultimately will include all of the training populations.

The Marines are extremely interested in this problem of injuries, and feel that the 45 percent injury rate that they have is unacceptable, and so they initiated a Quality Management Board a year ago, and the whole thrust of this Quality Management Board is injury prevention, and prevention of attrition in recruits. This board is represented by both community generals in San Diego, by our command, by the Naval Hospital command, as

well as Camp Pendleton, in San Diego.

The whole thrust of this has been not to jump and make preliminary recommendations without good support, but instead to try to collect some information from a number of sources, and then try to brainstorm amongst all of the principals, to try to come up with a preventive strategy, and then test that strategy, and we're just now in the process of trying to. We've collected some information, and we are getting together with the colonel who heads up the Recruit Training Command, head of the School of Infantry, et cetera, all of these principals, to try to decide what makes the most sense, to try to start lowering these injury rates.

The line is extremely interested, and does not feel that this is acceptable, but we all have wanted to try to make some recommendations that make sense, rather than just guessing.

MR. FLETCHER: What I said earlier, all the effects that you're trying to gain on the positive side are dose and time-related, and all the injuries are dose and time-related. You should be able to show at what point you have -- you have people come in, some of whom are obviously already exceeding the optimal standard that you want, and making them undergo training to the extent you do, they step in a hole. You haven't improved their aerobic capacity. You haven't really done anything for them, other than sprain their ankle. So the question is,

what is the output of this, you know, and you really could be more careful with some prescreening, or pretraining, as was said earlier.

MS. BRODINE: Absolutely.

MR. FLETCHER: You walk them in, the first day you have them run six miles, or have them run a mile. If they can't get under the time, you go back and run until you feel a little better about this.

MS. BRODINE: Well, what we tried to do is create a model in which we can start to test things systematically, and again there's a lot of interest. There's a lot of interest from recruiting centers, because each of these colonels that head up a recruiting station are held responsible for how many recruits that they ship actually make it through, so they're asking us, "Can you give us some predictors of people who will absolutely not make it at all?," and so that's where we are.

PRESIDENT DOWDLE: Thank you. Captain Cunnion?

MR. CUNNION: Yes. To address Doctor Ascher's thing about physical fitness, I have agreement now, on the line side of the Navy, that we're going to split out personal fitness from job activity fitness, where we'll be doing, for physical fitness, we'll be doing submaximal tests, but then, for different jobs, we'll have different job requirements for physical, and these will be unisex, because they have to be, just like policemen and firemen.

MR. FLETCHER: Absolutely. That will help the

problem, because in some categories the women are not required, and they'll do better.

PRESIDENT DOWDLE: We've got just a couple more minutes. I think there are two other questions. I think you had a question, Doctor Poland?

GREG POLAND, MAYO CLINIC

MR. POLAND: Yes. I was going to commend Colonel Jones for his report. I thought it was an outstanding report, and a model of what I'd like to see, in terms of the data that's presented to us. It was superb.

The particular question I had for you was, the ankle brace that you commented on, where you're starting to see an increased rate of injuries years after using it, is there a difference in the decrease in injuries, using the ankle brace, whether they are fully combat ready versus not? I understand that they might jump with 100, 150 pounds of equipment, and there may be a difference in those ankle injury rates, if you're not carrying that equipment.

MR. JONES: The population in which the surveillance system is in place, and they're seeing the rates go back up, is the Airborne School, and they routinely do what are called "Hollywood jumps," where they wear no combat gear. They may make one night jump, and the five classes that we followed actually made a night jump. They all make one equipment jump. So that's not a

particularly good population to look at the brace, and your point is well taken.

The second population that you saw, where the rates were much higher, was a combat unit, and it was a mass tactical jump, and they were wearing combat gear, and the loads were in excess of 100 pounds. It was at night, and it was under adverse weather conditions, which probably would mediate towards canceling the jump, in an airborne class.

I used that as an example of the need to monitor programs. I was responsible for doing both of these studies, and we were excited about the apparent positive effect of the ankle brace, but that was just two relatively small studies, and I think when you consider that the cost of the ankle brace is going to be, ultimately, somewhere between 25 and $50, that's a significant enough expense that, before you really go out and field it Army-wide, you really want to make sure that the thing works, and I tried to slow them down on this, and perhaps the statistics that they have now will encourage them to come back to us, and to provide populations to look at this more thoroughly.

MR. FLETCHER: A word of caution. Was the increase only ankle injuries?

MR. JONES: Yes.

MR. FLETCHER: Because this could be like ski boots, where you now have redesigned your boot to transfer

all the injury to the knee.

MR. JONES: We specifically looked at that, in fact, and actually, in the Airborne School and in the airborne population we looked at, the incidence of injuries above the ankle was no different, and so all of the difference in the two populations was due to the change in the ankle injury rates, and we haven't heard any reports from the surveillance system, either, of higher injury rates.

PRESIDENT DOWDLE: I'm sorry. We'll have a last question. Doctor Stevens?

MS. STEVENS: It's just a comment, I guess. It seems to me there's a potential pitfall of Doctor Ascher's suggestion that we push some of these recruits to get into shape before they come in. You're sort of maybe pushing the way you count injuries. You know, it may be an advantage, in fact, to have people coming in and get training under supervision, rather than have them go out and run and get in shape before they get in. You may be just shifting the way you're counting injuries.

MR. FLETCHER: That was going along the lines with Captain Cunnion, that people who know they're to be Seals really should be more aware, that it's the general one versus the very specific ones that have these very strong requirements, that might be prepared better.

PRESIDENT DOWDLE: Okay. Thank you.

(Whereupon, at 11:47 a.m., the above-entitled

matter was recessed, to reconvene February 16, 1994, at 7:30 a.m.)